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NOVEMBER, 1908

SELLING ELECTRICITY

Edited by FRANK B. RAE, Jr.

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SPECIAL TUNGSTEN LAMP NUMBER

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Your Jobber's Salesman Says:

Brilliant Tungsten Lamps are the lamps we recommend

The jobber *must* handle the best lamp he can get. His trade *depends* upon his giving *quality*. He is in position to *know* lamp quality. More *prominent* jobbers have **Brilliant** lamps than any other lamp. *Why?*

QUALITY GOES UP

PRICES GO DOWN

No. 1 Meridian Type

New *List Prices* now in effect on

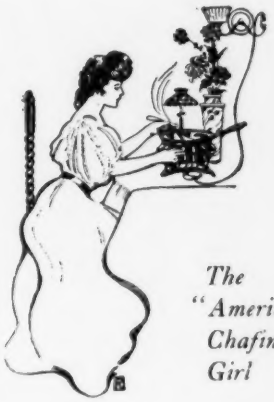
Brilliant Tungsten Lamps

Size	Clear	Frosted
25 Watt	$ .85	$ .90
40 Watt	1.10	1.15
60 Watt	1.40	1.47
100 Watt	1.75	1.85
No. 1 Meridian, 40 Watt	1.50	1.50
No. 2 Meridian, 60 Watt	1.75	1.75

Minimum discount on standard package quantities to any customer, 10 and 10 per cent

Brilliant Electric Company

CLEVELAND, OHIO



The "American" Chafing-dish Girl

Sell Service

You're looking for goods that are easily sold, that stay in order, that the consumer uses whenever possible and is proud of.

Aren't you?

If you are looking for that sort of chafing-dishes, percolators, disc heaters, curling-iron heaters and flat irons—we can do business together.

In selling **American** goods you are selling solid comfort, you are selling *constant service.*

Why not sell goods that will be a continuous source of revenue *after* the sale? That means more than a little profit *on* the sale.

We have a catalog for you —*free.*

American Electrical Heater Company

Detroit, Michigan

HALT and HOLD

The buyer's attention through the attractiveness of the vehicle conveying your advertising appeal and the latter will surely "get home."

Real Photograph Advertising Cards

This pose is one of a number for cards especially made for Brooklyn Electric Illuminating Company, Brooklyn, N. Y.

Half Tone Reproduction Full Size of Card.

are an attractive vehicle of publicity and will take "home" the Central Station's advertising appeal. A campaign in the interest of **Electric Heating Appliances** through the medium of these cards will show a surprisingly satisfying result. **This is the proof of experience.** The cards are real photographs, printed on sensitized paper direct from negatives. An original series of real photograph cards will make a producing advertising campaign.

The Rotograph Co.

Photo-Advertising Dept.

684 Broadway, New York

IT IS OUR BUSINESS
TO GET
NEW BUSINESS FOR YOU

We can do it if you will give us a chance.

We have been doing it for other companies and know what we are talking about.

We don't serve our clients with luke warm syndicate matter. We give them absolutely individual treatment.

First we locate the cause, then the effects, and finally show the remedy.

That is what our Commercial Engineering Investigation consists of.

It shows you where your commercial department is weak and shows you how to strengthen those spots.

Then, if desired, we will "apply the remedy" we have prescribed.

We don't give you valueless advice — we back our statements by work.

Let us hear from you in regard to this proposition.

It may mean money to you.

Write us to-day.

C. W. LEE COMPANY

West Street Building **NEW YORK**

When a Customer Kicks

Three-quarters of the complaints that reach your office are caused by high bills.

Customer claims he didn't use so much current. Meter says he did. You must rely on the meter, of course.

But is the meter reliable?

To satisfy the customer—and yourself—you order the meter tested and if you find it wrong YOU LOSE—your prestige with customer, the amount of the adjustment of the bills, the cost of repairing the meter and—YOUR TEMPER, but—

The customer tells his friends.

Next time any of these friends has a high bill he kicks.

More inspections, tests, repairs, adjustments—all costing money.

What are you going to do about it?

THE WISE THING is to ADOPT Fort Wayne TYPE K METERS

They are RELIABLE. They require the minimum of inspection—practically no repairs. They are ABSOLUTELY dust- and insect-proof. They are sturdy—built for PRACTICAL service.

Bulletin 1053 tells the story. Get it.

FORT WAYNE ELECTRIC WORKS

"Wood" Systems **FORT WAYNE, IND.**

A THREE-SIDED AFFAIR

It's a Three-Sided Affair---the TUNGSTOLIER

TUNGSTEN LAMPS
HOLOPHANE SHADES
SCIENTIFIC FIXTURE

Tungsten lamps are admitted to be the acme of lamp perfection. Who hasn't heard of them?

Holophane shades are holding their own, and conceded to be the finest thing for diffusing light.

The Tungsten lamp in a Holophane reflector gives a marvelous distribution.

Fixtures, after a fashion, are to be had. But they're fixtures. The one used with the Tungstolier is made for TUNGSTEN use. It has link suspension, protecting the Tungsten lamp from vibration; is properly proportioned and uniquely finished in nickel, which harmonizes with the soft, white lighting scheme.

These three—the Tungsten lamps, Holophane shades and the proper fixtures—make up the Tungstolier.

The effect is threefold: A tremendous saving in the cost of operation as compared with any other lighting system; a quality of light that is as near to the sunlight as can be had, without calling it "sunlight"; a unit of pleasing appearance.

Truly, a Three-Sided Affair.

The Tungstolier Company

Schofield Building

Cleveland, - - - Ohio

BRANCHES:

126 Summer St.
Boston, Mass.

301 Ashland Block
Chicago, Ill.

500 Delaware St.
Kansas City, Mo.

419 Metropolitan Life Bldg.
Minneapolis, Minn.

29 S. 9th St.
Philadelphia, Pa.

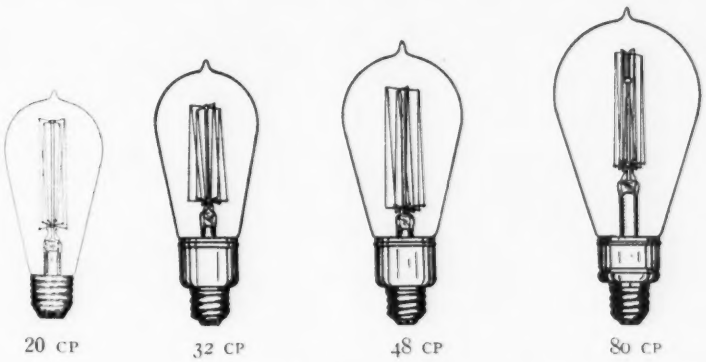
414 Wood St.
Pittsburg, Pa.

27 E. 21st St.
New York City

309 Mermod-Jaccord Bldg.
St. Louis, Mo.

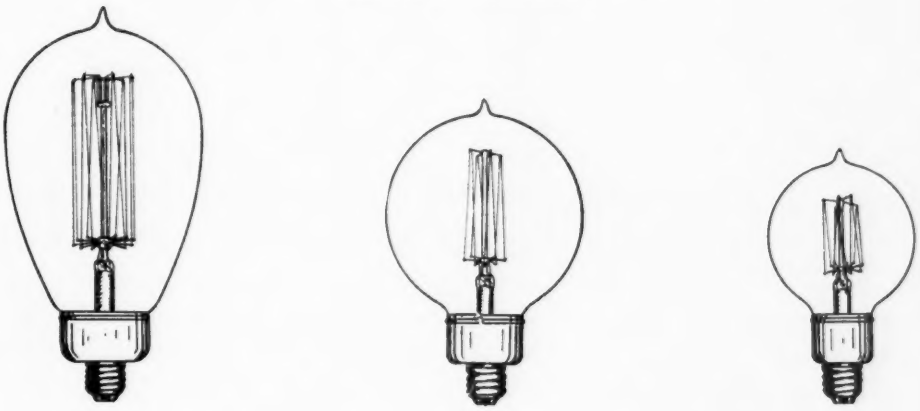
Atlanta, Ga.

G. E. Tungsten Lamps



20 CP 32 CP 48 CP 80 CP

REGULAR TUNGSTEN



200 CP 60 CP 40 CP

MERIDIAN TUNGSTEN

ALL SIZES *ALL STYLES*

WE HAVE THE LAMPS
AND THE QUALITY

General Electric Company

Main Lamp Sales Office : *HARRISON, N. J.*

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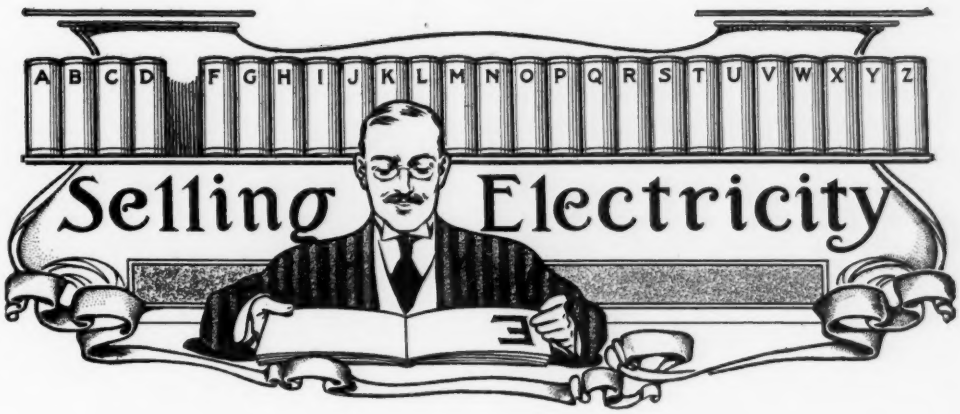
I've heard lighting men say "Tungsten lamps are too efficient," but nobody ever said that about a man.



EFFICIENCY

TUNGSTEN typifies efficiency. Efficiency does not mean the production of an equal quantity of results at a lesser expenditure of energy; it means the production of greater results from the same energy.

And that is what the world wants —more for its money.

Efficiency in lamps, machines, apparatus, may safely be left to the scientist and inventor. Improvements come about as fast as we can assimilate them.

But efficiency in men is something that cannot be developed in the laboratory—something for which demand always outstrips supply—something for which we, in the electrical field especially, have imperative need.

Efficiency in men means exactly what it does in a lamp or other piece of apparatus; a higher ratio of output to input. The input is salary and expenses; the output is results. We require, not the same results from cheaper men, but greater results from the same men—more for our money.

Can we get them?

No.

Why?

If one goes into the market for a piece of electrical apparatus or a draft horse or a ton of coal he finds this condition to exist; the better the article is the more it costs, and the more it costs the more it is worth. In other words, the machine or horse or ton of coal that costs the least is relatively the most expensive. Circumstances may direct, or our means compel us to buy the cheapest article, but in doing so we pay the highest price per unit of results.

And this is true of men. For in the last analysis the brains and labor of men are but merchandise and subject to the law of supply and demand.

A tungsten lamp at a dollar and a half looks high priced when compared to a carbon lamp at fifteen cents, but we all know that it isn't. A fifteen-dollar-a-day man may look high priced beside one to whom we pay a dollar and a half, but if we measure his value by the same standard which we apply to the lamp, it will generally be found that he is the cheaper to hire. Dollar for dollar, he will produce more.

The central station industry, so

keen to appreciate efficiency in apparatus and material, seems utterly blind to the value of efficiency in men. Companies which will cheerfully spend thousands to gain some slight advantage in generation or distribution of current will pinch pennies in their new business department salary rolls.

This is wrong and has led to a misconception of the importance of new business men and their work. It has deterred many high grade commercial men from entering the industry. It has neglected to reward adequately those who are in the work and whose knowledge and skill and labor are doing so much for the business. It has lowered the standard so that inefficient men are content in their inefficiency and those who should aspire to advancement feel the pathway barred.

This question of men and wages is many-sided and every individual case differs. To say that central station commercial men are all underpaid is just as untrue as to say that all get value received. Some are overpaid; some underpaid; some paid exactly what they are worth. That, however, is no part of the discussion. The point is, the standard of men in this business is too low and the good men in it feel bound down and abased by this low standard.

Before we can hope to have many high efficiency men in the central station commercial departments we must be willing to pay for them.

And like the tungsten lamp, they are worth their price.

Welding the Tungsten Filament

By S. E. Doane
Chief Engineer National Lamp Association

THE tungsten lamp filament is truly a wire of metal. The method of manufacture, however, differs from that of any wire which is in common use in that it consists in welding together minute particles of tungsten metal. To fully understand how this wire is made it may be well to consider some of the interesting facts of the behavior of certain metals and other matter, which will show along what lines the tungsten lamp engineers have worked.

If two sheets of plate glass are allowed to rest one upon the other for a year or two it will be found, more often than not, that when one tries to separate these plates of glass that they are adhering. In the case of a pile of plate glass the bottom pieces may be found to be firmly welded together. If one lays two pieces of gold leaf together they will, under ordinary circumstances, weld into a single sheet. We are all acquainted with the fusing into one piece of two ingots or pieces of metal such as copper when the temperature is sufficiently high, and the weld may be perfect though temperature is something less than the melting point of the metal. One of the most interesting examples of weldable materials is iron, which makes a perfect weld at less than the melting point.

The welding of pieces of glass or

gold leaf when slightly pressed may be avoided by various means, such as dusting the glass or laying sheets of paper between the glass or the gold leaf. Similarly, the intervention of foreign material may prevent perfect welding of almost any metal.

It is a precisely similar method of welding which the tungsten filament passes through, and the reason this method must be employed is that tungsten metal has never been melted and therefore cannot be worked into wire in the ordinary way. The tungsten filament is not constructed from an ingot of tungsten, but from finely divided metallic tungsten pressed together into the form of a wire and then welded. This wire is exposed to a very high temperature at which time the tiny particles of tungsten metal weld together, but this temperature is something below melting point. As will be seen, it is necessary that this welding operation should be exactly right in order that there shall be a perfect weld. Just as a spot of oxide on heated iron, or grease or dirt on the glass tend to make an imperfect weld so the slightest foreign substance in the tungsten will render it imperfect when welded into filament wires.

All tungsten filaments are, in the sense that I have described, a welded filament from one end to the other, of which the particles welded are all extremely small. Our hope of the future lies in the perfection of this welding.

The great improvement in the strength of tungsten lamps during the past few months and the fact that tungsten lamps have been made which are practically indestructible, lead us all to expect that we shall succeed in eliminating some of the weaknesses which have characterized the tungsten lamp of the past.

Breakage in transportation is less than one-half of one per cent. This is not excessive but the public unfortunately is accustomed to handling much more robust lamps and are therefore not as careful as they should be. This means that they are suffering greater loss with the tungsten lamp in the handling of it than we are in our transportation. That this condition will be improved, and in the immediate future, is not to be doubted.

Smaller Bills at Higher Rates

By William S. Kilmer, I. E.

PREVIOUS to the introduction of the tungsten lamp, wholesale consumers did not as a rule find it to their advantage to reduce their monthly kw. guarantee or cut down their installation sufficiently to secure a contract calling for a smaller guarantee at a higher rate. Now that this lamp is firmly established in the lighting field, however, there have developed many cases where the customer was able by the installation of tungsten efficiency to cut down his capacity demand to such an extent

that he not only was disqualified as a wholesale consumer, but saved money on the subsequent higher rate contract.

Also, it has not taken the lighting specialist long to discover that there is a large field for operation among the wholesale customers of the central station.

It is the business of the lighting company to manufacture and sell electric current to such consumers and at such prices as the market may afford. In consideration of the station and line expenses of which each customer must pay his pro rata share, and because of the special local costs for connecting up each consumer, it is necessary and reasonable that the man whose demand is 5 kw. should pay a higher rate for his current than the man whose equipment consumes constantly 25 kw. Moreover, the central station can afford to make special dispensations to the customer who will guarantee a high monthly consumption.

The central station wants wholesale customers, with constant load and a guarantee of large consumption, but there are instances where it is most advantageous to reduce this demand by the introduction of lighting units of a higher efficiency, and to raise the customer's rate. It is advantageous to the company, because it sells a lesser quantity of current—which is stock merchandise—at a higher and more profitable rate and releases the balance of the original demand for sale at even higher price, through retail.

For example, a customer guarantees to use 2500 kw. per month at .06c. The lighting specialist convinces him that a 2000 kw. guarantee at .08c. will result in a large increase in illumination. The installation is put in and for about the same money the central station

gains 2000 kw. at .08c, or....$160.00
and loses 2500 kw at .06c., or 150.00

The gain on the transaction is $10.00
but there remains 500 kw. to
be sold at 10c, or..... 50.00

Therefore, the net gain is $60.00

No expense is entailed in making the change for the former wholesaler; and the resold capacity is at a rate which takes care of such costs as are incidental to the taking on of new retail customers. Moreover, the old consumer has been benefited for the central station has shown him how to get "something for nothing," more efficient and satisfactory illumination without material increase in cost, if any, and he has joined the benevolent ranks of the satisfied customers.

The average large installation is, as a rule, the worst example of inefficient illumination. The arc lamps are poorly adjusted, consuming, in many cases, 700 watts; the incandescents are poorly arranged. Many are, by the most crude and make-shift equipment imaginable, only partially doing their prescribed work, others are far beyond the smashing point.

The specialist re-designs the system, cuts out the forest of drop lights, and builds up the general illuminations by using fewer but higher candlepower units correctly equipped and located. Thus, 240 or 300 watts in tungsten lamps amply replace the arcs, resulting in a lower current bill for the consumer and a higher rate per kw. for the central station.

Tungsten Row

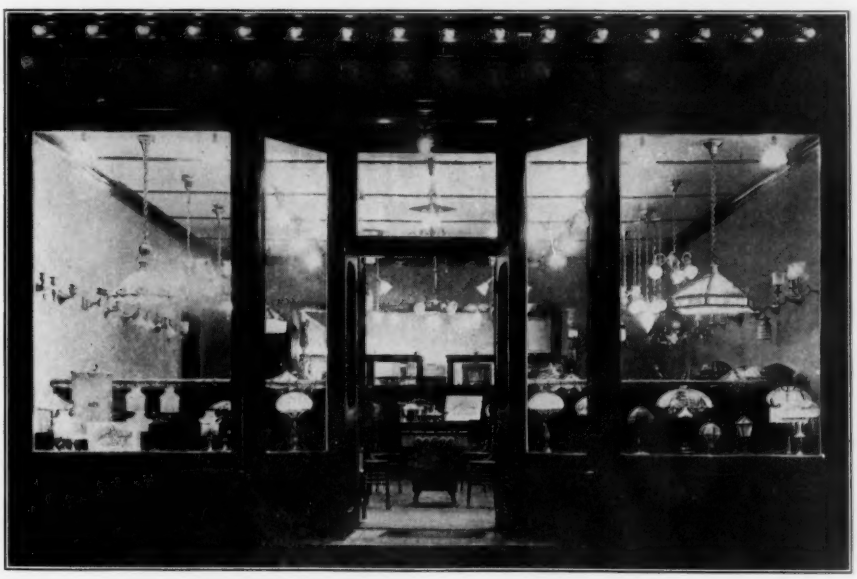
How Larrabee, of Bennington, is Raising the Standard of Illumination

By Frank B. Rae, Jr.

"TUNGSTEN ROW" is a strip of the main street of the tiny city of Bennington, Vt. It consists, at present, of six small stores—and one of the six is not lighted by tungsten lamps at all. But small as it is—even insignificant, in the eyes of large plant operators who are accustomed to think in thousands—Tungsten Row represents a successful experiment in the art of raising the standard of illumination, and as such is deserving of a good deal of attention, especially upon the part of managers of small plants.

To appreciate Tungsten Row one should know Bennington. Bennington is called a city in Vermont, not because it is city-size but because there are only a couple of towns in the state that are larger. It is up in the hills, on a side-track that runs about three miles from the main railroad. No matter where you come from or are going, you have to change cars twice to get in or out of Bennington. The town boasts of a fair hotel, a decent club, the usual assortment of small town stores, and E. E. Larrabee, manager of the lighting plant.

Larrabee's chief characteristic is curiosity. He wants to know. Moreover, he is willing to try anything—once, at least. I have known Larrabee quite a while and I have yet to see him crawfish at any proposition. The result of this inquisitive nature is



Display Rooms and Offices Bennington Electric Company

that he has a fund of first-hand information on a variety of subjects, technical and otherwise, the equal of which few central station men can boast.

Curiosity led him to take up the tungsten lamp—personally, not by proxy. Instead of writing to everybody in the industry for advice and suggestions as to how, or whether, to take up the new unit, he wrote in to the manufacturer for a case of the lamps. When they came, he sorted through the wreckage till he found one that would burn—this was in the early days when tungsten filaments were more or less fragile—tucked it in his pocket and went down to see Jones, the grocer.

"I have a new lamp," said he, and carefully screwed it into a socket. That was all, except that that evening when Jones called him up to ask whether it took as much current as an arc lamp, he replied, only as much as a 32 candlepower carbon. Later he was asked how much it cost: his answer was, two dollars. There was no solicitation — Larrabee let the grocer do his own worrying.

The upshot of this little bit of politics was that one by one the merchants came to him. They wanted the new lamp. He was pessimistic. Finally, he put in a complete installation—put it in his own way on his own terms —put it in right.

One of the Stores in Tungsten Row. This picture is a most excellent example of interior photography by artificial light. It shows how closely the tungsten light approaches daylight in photographic value.

That was the beginning of Tungsten Row.

* * * *

The pictures tell their own story, but not all of it.

The tungsten installations showed a saving and put the merchants in the

mood for a new proposition—outline lighting on a flat rate. As Larrabee says:

"There are good things to be said about flat rates where the lighting is controlled either by time switches or patrolmen. The principal argument I know in favor of it is that the central station man knows just what he has to deliver, aand he simply sells so many goods for so much money; on something about what he is buying the other hand, the customer knows and he knows just what the expense will be. It is easier to get a fair price per kilowatt-hour on the long-hour burner than it is to get a high price per kilowatt-hour for the short-hour burner.

"Our experience has been that, in a little town like ours, a person having display lighting of any sort on meter will use far less current at a regular meter rate, as he will be continually worrying about his bill, trying to keep it down. He will delay lighting up until it is quite dark, and he will turn off the lights a half hour earlier because he is afraid his bill is going to crawl up."

This outline lighting is done in iron conduit with condulet receptacles, and the Bennington Electric Company puts the work up, maintains it and lights the lamps from dusk until ten o'clock, seven nights in the week, at 25 cents per month per lamp.

The construction work costs the company about $1.00 a light, though part of it has run somewhat over that. Mr. Larrabee figures if he allows three lamp renewals (which would be 50 cents more each year) that at the end of two years, he will spend about $100.00 per kilowatt, allowing $1.00 per lamp for installation and six lamp renewals, and that he will have received about $300.00, which gives a net income of $100.00 per year per kilowatt. This is a price at which, as he says, "I think we would all be pleased to sell our station capacity."

* * * *

Now, some may say that this display lighting could have been secured anyway, but as it happens, it couldn't. The plant was pretty well loaded to capacity. Until the tungsten lamps cut down the peak hour demand, there was no opportunity to take on the long-hour business.

So the tungsten lamp in Bennington is the means not alone of increasing the standard of illumination in store interiors, but it has cut down the

Tungsten Row, Bennington, Vermont

peak, filled in, to some measure, the after-supper valley of the load curve and has enabled a small station in a small town to sell small merchants an amount of display lighting which would do credit to a fair-sized city. It has made the merchants realize the value of electric advertising. Finally, it has brought the company forward in the light of a civic benefactor.

Tungsten Lamps in Waterville, Me.

How a Small Central Station Faced a Tough Problem and Solved It With the Tungsten

By W. S. Wyman
Manager Waterville & Fairfield Railway and Light Co.

THERE are two companies competing for the electric lighting business in Waterville and the surrounding towns. The rates are very low, a considerable portion of the residence business being on meters at rates varying from ten cents to two cents per kilowatt hour and a greater part of the store lighting being on flat rates based on a price of about 25 cents per 16 cp. lamp, per month, where the installation is of any size.

During the past six months we have installed 600 or 700 tungsten lamps in the 40 and 60 candle-power sizes, largely the former, replacing with them ordinary carbon filament and Nernst lamps. In most cases the customers has paid the expense of the fixtures and the company has furnished the first installation of lamps where Nernst were replaced. Customers are required to pay the whole expense where carbon filament lamps were displaced.

The result has been a considerable decrease in demand for current for the same revenue and as we have been able readily to sell this extra current for lighting installations and various uses, the net result has been a considerable increase in revenue with but a very slight increase in the load.

The lamps have given excellent satisfaction as regards light and life. In one store where we installed about 160 40 cp. lamps, the customer has purchased only two renewals, although the lamps have been in use since January. We had over 400 in use for some time prior to the first of May and yet during the past six months renewals have amounted to considerably less than 50, and of these some have been replaced free by the lamp manufacturer on account of the extremely short time which they burned.

The residences are taking hold of them rather more slowly than the stores although many of the new houses are planning to fit up with electroliers and brackets especially designed for the use of this lamp.

If the tungsten lamp could be produced at a lower price and in a more substantial form, it would greatly add to its usefulness, but even without these changes, we believe that in a comparatively short time, more than half of the lighting in this town will be done with tungsten lamps.

Introducing Tungsten Lamps into Minneapolis

By H. J. Gille
Contract Agent, Minneapolis General Electrical Co.

THAT the introduction of a new illuminant of superior qualities and of greater increased efficiency than any other previously presented to the public, should result in deterring the increase of the business of a lighting company, is an absurdity. In my opinion, it is a narrow-minded policy which would encourage the discouragement of a new light or a new system of lighting, because that light or system might consume less fuel or current. It should be held uppermost in the minds of all whose duties consist of serving the public, that the public is the first to be considered, and as I view it, it is the duty of every public service corporation to adopt as soon as it has been proven practical, a new lamp that gives better results not only in the quality of light but in the cost to the public, of that service.

H. J. Gille

Furthermore, a public service corporation should take the initiative in introducing such a public benefit, even if on the surface it might appear that gross earnings would be affected by such a movement. However, the good will of the public and the popularizing of the service will do much to increase the use of current.

With the introduction into the gas business of the Welsbach burner there was a fear on the part of many interested in gas companies that it would temporarily, at least, check the increase in gross earnings. The sale of this illuminant was therefore not forced; if anything, it was withheld. Gradually, however, its great economy became realized by the public, and its general introduction for gas lighting was soon accomplished; and we all know that it was salvation of the gas business for lighting purposes. The Welsbach mantle certainly revolutionized that branch of the industry.

The tungsten lamp occupies much the same position in the electric light industry today that the gas mantle did years ago in the gas business. More economical light is necessary to compete with other forms of illumination, and this competition is placed on a purely cost-of-operation basis. The tungsten lamp, therefore, makes it possible to develop a large amount of business that heretofore has been difficult on account of competition of this character.

The tungsten lamp was placed upon the market in Minneapolis about a year ago. Several complete installations were made in stores and almost immediately there came numerous inquiries from the public regarding the new light, its superiority being immediately recognized. The increased illumination made possible with the tungsten lamp at no increased cost for current attracted considerable attention.

It was at first thought that the introduction of these lamps would considerably reduce the lighting bills of the merchants. This, of course, was possible, but when they realized the advantages to be gained by a higher standard of illumination, the cost of operation was not such a serious item. It was pointed out that instead of effecting a saving in current consumption, the merchant could and should utilize approximately three times the amount of illumination that was secured with the old-style units for the same money.

In the city of Minneapolis, as is in all probability true of other cities, there was a very great demand for a more efficient light. The city is growing very rapidly and the cost of current for ordinary carbon-filament lamps, was greater than certain classes of customers felt they could pay. In many cases these customers resorted to other methods of illumination, but when the solution of economical electric lighting came with the advent of the tungsten lamps, there came also the solution of this phase of the electric lighting business.

Within the last three months the tungsten lamp has spread to the home. The demand for them for residence lighting bids fair to create a general desire on the part of every one within the reach of current, to have their homes lighted with electricity—in fact, the tungsten lamp is the talk of the town. One can hear daily discussions on the street cars regarding this wonderful new light.

We arranged dark booths in the office in order that the new system of lighting might be more clearly illustrated. We are doing everything possible to introduce its use both in the industries and in the homes.

Another point that should not be overlooked, is the fact that with tungsten efficiency customers feel that they are getting value received. We have numerous cases where consumers have felt that they were not getting the results in illumination that they were paying for; consequently there was considerable dissatisfaction. The tungsten lamp has worked wonders with this particular class of customers, and instead of their being dissatisfied, they are big boosters for electric lighting.

We have devoted considerable time and attention to the proper installation of the lamp, as it is necessary; in almost every installation, to completely re-equip the store or residence for the proper use of the tungsten unit. The results of proper installation, I feel, has had much to do with the success of the introduction of these lamps in this city. The illumination in the business district is rapidly being changed, and a higher standard of illumination is sought by the merchants.

Shortly after the tungsten lamp came upon the market, there was a system of ornamental street lighting

under consideration in Minneapolis. The new lamp was considered for this use, was adopted and installed, there being five 100-watt tungstens on each post, spaced one hundred feet apart on each side of the street. These lamps were installed with the tip upward, and there was considerable question at that time as to whether they could be used in this position. They have proven remarkably successful, and I believe it is the first installation of this nature ever undertaken.

Not only in the interior lighting and the street lighting is the result of the new illuminant made manifest, but in show windows and signs and both interior and exterior decorative work. In the show windows in Minneapolis in particular, there has been a very great change: in fact, there are now comparatively few stores that are using anything but tungsten lamps for window lighting. This change has also greatly improved the illumination on the street.

That the tungsten lamp is a practical illuminant of immeasurable value to the public, is not the question at the present time—this has been proven. What remains to be done and what central stations of today are striving for, is to impress on the public the value of this new medium of economy, and bring about the universal adoption of the tungsten lamp where other forms of illumination are now used. We all know that electric light has a great many advantages over all other forms of illumination. It is not necessary to enumerate them here. But with the only great drawback—the cost of operation—banished by tungsten efficiency—electric lighting should become general whereever current is available.

A Dollar Idea

Geo. H. Share Emerson Electric Manufacturing Co., St. Louis.

THE simplicity and success of renting a portable motor-driven vacuum cleaning outfit brings to mind many other motor-driven devices that can profitably be handled on the same basis. There are a number of expensive outfits that are very difficult to place, especially in a small city, but which could be rented by the central station at a handsome profit.

For instance, advertising display fixtures operated by electric motors might well be owned by a central station and rented to merchants for the show-window. A horse clipping or grooming machine might be maintained for the use of private stables at a very reasonable charge. Small electric drills and portable grinders could probably be of use in construction work if they were available at a moderate expense, while they are not purchased by many of the smaller firms on account of the investment. The electric carpet cleaners and carpet sweepers might well be profitably rented in the larger cities where hotels and larger homes require the improvements of modern methods to clean quickly and effectively. A central station following this policy would very quickly familiarize its customers with the convenience and economy of electric service in varied forms which probably will not be brought home to them for some time unless some such plan is pursued.

The Use of Reflectors

By W. J. Cady

A REFLECTOR is almost as necessary with the new and brilliant lamps which are now being made, as is a nozzle to a hose. By means of the nozzle a gentle spray or a strong stream of water may be thrown in the desired direction. With the reflector the light may be spread out at wide angles and of mild intensity, or it may be concentrated in a powerful beam over a small area. But one can go even further than this in designing a reflector, for it may be made to give almost any desired form of illumination from the lighting of a small room in which uniform illumination is desired from a single unit to that for uniform lighting with a considerable number of light units.

When it is considered that in the tungsten lamp only 50% of the light is directed below the horizontal and that the end-on candle power, or candle power directly below the lamp, is only about 10% of the horizontal candle power of the lamp, it is readily seen why a reflector is necessary, especially when it is considered that by its means the light in the lower hemisphere may be increased from 50% to 80% and the end-on candle power increased from 10% to 700% or 800%. It is just as important, although not usually so considered, to obtain a given increase in the efficiency of the light unit, the light unit being taken as the lamp and its reflector or globe, as it is for the electrical engineer to obtain the same gain in efficiency in his electrical apparatus. And to what trouble and expense will he not go to make a 5% gain in the efficiency of the generator?

The increase in the efficiency of the newer lamps has been accompanied by a corresponding increase in the intrinsic brilliancy, or candle power per square inch, of the glowing filament, so that it becomes almost imperative that such lamps should be covered with some reflector or enclosing globe in order to protect our eyes from the intense glare of the filament. And when the lamp is to come within the field of vision, a lamp with a frosted tip should be used so that when used with a reflector, no part of the bare filament is seen. This matter of cutting down the direct rays of light from the filament cannot be too strongly urged, for the neglect to take this into consideration will certainly lead to very disastrous results.

The necessity for reflectors is therefore three-fold: to direct the rays of light and concentrate the illumination where desired; to conserve the light by preventing waste, and to shield the eye from injury through exposure to the intense brilliancy of the light centre.

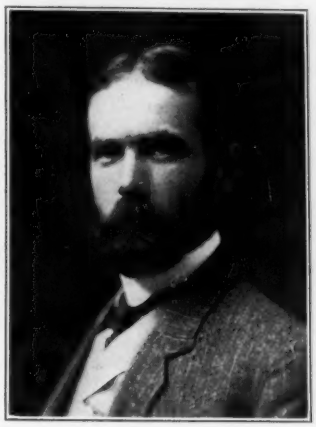
With the increase in the brilliancy of light sources and the perfection of lamps of higher efficiency there is an ever-growing need and demand for accurate reflectors designed for use in combination with special lighting units. The reflector is as the handle to the tool, essential to its proper use and efficiency.

Successful Selling and Renewal Schemes

The Experience of a Small City Central Station in Handling Tungstens

By L. D. Mathes
General Manager, Union Electric Company, Dubuque, Iowa

THERE has been so much said of late about the tungsten lamp that most every scheme that could be thought of has been discussed. It is difficult even to devise an original phrase as an expression of approval — "Enthusiastic Supporter" — "It will Revolutionize"—"Death to the Gas Arc"—"The Tungsten has Come to Stay," and all of the good strong ones have been "worked to a finish" of late.



L. D. Mathes

The Union Electric Company took up the tungsten lamp early; indeed, we had such confidence in the lamp that we bought half a car load "right off the reel." We did not, however, advertise the unit in box car letters, for, thought we, "What's the use of disturbing a lot of well satisfied customers?"

Our efforts have been given entirely to pushing the tungsten as a substitute for gas and to hold customers who were dissatisfied on account of price or quality of the illumination by other electrical units. This doesn't mean that our policy has been to sand-bag the good-natured individual who doesn't know enough to make a howl—far from it. Any customer can get the lamp for the asking, even though it should make a material reduction in his bill, but we do not assume that the reductions in consumption are of such percentage that it makes serious inroads on our income. On the contrary, we feel that if the situation is skillfully handled the customer will pay practically as much for a tungsten installation as if he were using some other type of lamp—this payment, of course, including lamp renewals. But even granting a slight reduction, the central station would benefit by the use of the new lamp because the customer, in getting so much more for his money in the way of illumination, would be better satisfied,—and to get a customer in this state is admittedly the greatest joy of life to the central station man.

Our first plan was to sell the lamp outright, with no guarantee of its life. The customer would come in and buy a renewal regardless of whether he got 100 or 1200 hours' burning. This didn't work

long because some of the lamps blew up within 100 hours, some within 50 hours, and a few didn't last 5 hours. Under those conditions, to ask a customer to hand you $1.75 for a new lamp was about the same as requesting him to discontinue as a consumer.

Our next proposition was to guarantee the lamps for 600 hours—the 100-watt lamp being the size we were featuring—and we proposed to make renewals at the rate of 3c. per kwh. consumption as shown by meter. This brought us $1.80 for the renewal, the same costing us $1.68 and the 12c. was applied to breakage in handling.

When the 250-watt lamp came along, a number of people, particularly small shop-keepers, wanted this lamp—but not at $4 per. We thereupon put into effect a scheme for renting the units—100-watt lamps and less at 25c. per month, and the 250-watt size at 50c. per month. Under this plan there is no charge for the original lamp—we provide the same and take care of all renewals for rentals mentioned. The plan is working out quite satisfactorily. I really believe that it is the best scheme of all, as it relieves the customer from the suspicion that through renewal charges he is paying a heavy premium for the use of the tungsten lamp.

There is one feature of this plan which has been suggested as weak, which is that it savors of the gas company's plan of charging a monthly rental for their gas clusters. As a matter of fact, the class of people we are renting these lamps to have been gas consumers all their lives, and are reconciled to the rental plan.

In our opinion, the central station should have several ways of presenting the tungsten lamps to a consumer. Each individual does not look at the lighting proposition from the same angle. Give him two or three options, and let him pick the color he likes best—the net result to the company being in any case the same.

We are just going into the tungsten cluster work, as to date we have confined ourselves to the installation of single units. The Tungstolier Company of Cleveland had an engineer with us a short time ago; he called on a number of prospects and assisted in placing installations of tungstens in clusters. This assistance was much appreciated as in a town of this size if you can get two or three installations to refer to, progress is much easier. You can then make an announcement from the Town Clock corner that the best thing that has ever happened in the way of illumination can be seen at the establishment of Mr. Lux—and those seeking light forthwith gallop down to see what Mr. Lux has on exhibit. If it is good, it is natural that they want the same things.

To conclude: the tungsten lamp is all that the manufacturers claim, —in fact it is more than they originally claimed, and getting better all the time. Any central station can place the lamp—it is merely a question of following the method offering the least resistance and the most profit. The idea held by many benighted exponents of light, to the

effect that the adoption of the tungsten lamp will bring reductions in billings and will kill their business, is nothing more or less than a thirty-three degree "bogey man."

Tungsten Street Lamps Withstand Lightning

Bolt That Knocks Out Woman Fails to Injure Lamps

DURING a severe storm in Hackettstown, N. J., last summer, the series incandescent line was struck by lightning, the discharge pasing through thirty-three tungsten lamps. The filaments were slightly curled as is shown by the illustration, but the

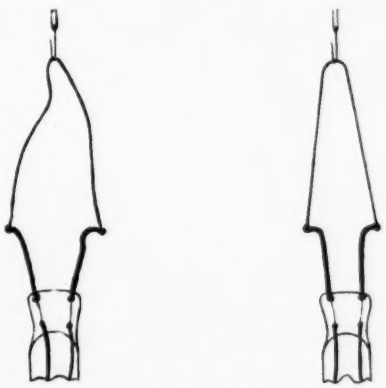


Diagram showing normal filament of series tungsten lamp and same after lightning struck it

lamps did not burn out. This same stroke of lightning burned out three transformers then jumped to a private house ripping off a door sill, knocking a woman unconscious and passing into the ground through a steam radiator.

The following extract of a letter from Mr. P. Louis Smith, Superintendent of the Hackettstown Electric Light Company, regarding the occurrence, is of interest:

"You will note the twisting of the filament, which is still intact, only loose from the anchor. This lamp was at the end of a loop about 500 feet long, branching from our main street to a side street. The lightning here was so severe that it struck our lines in four or five places, thus following our wires in several directions at the same moment. The top of one transformer was thrown 200 feet from where it hung on a pole.

"We have 123 tungsten lamps on our street circuit; thirty-three were put out temporarily because of the mica disc taking care of the shock. When new discs were installed the lamps burned all right.

"Only last summer we had a severe lightning storm here and it burned out fifteen carbon lamps and melted the sockets completely. Thus our change has almost been paid for in obtaining such good results from the new sockets and lamps."

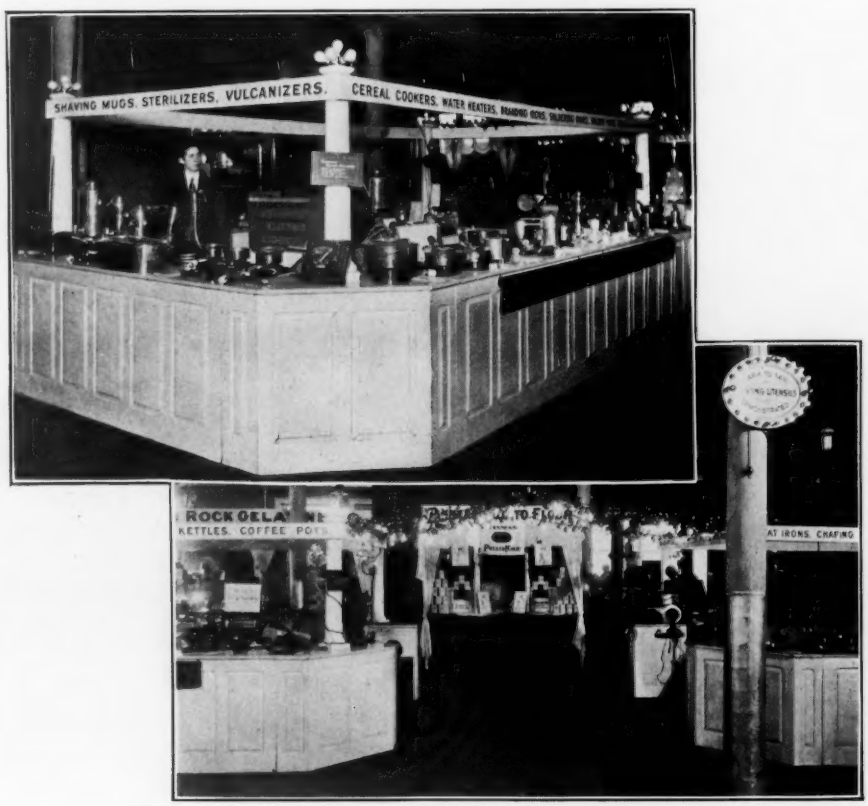
A Sectional Display Booth

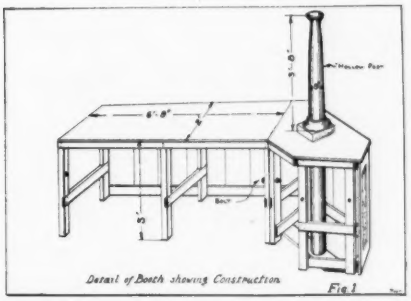
By F. S. Root
Narragansett Electric Light Co., Providence, R. I.

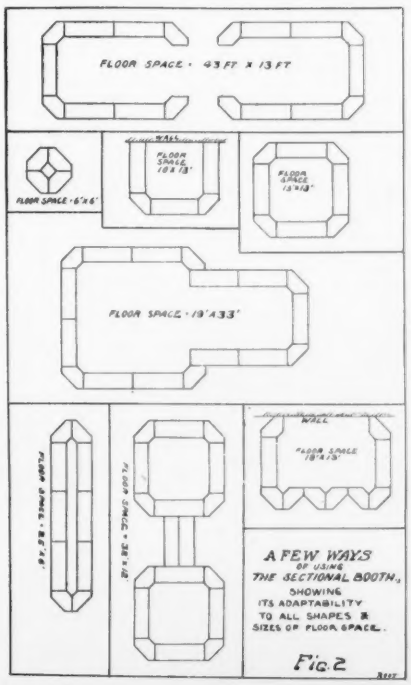
ONE of the most profitable ways for a central station to advertise, is through the display of small electrical appliances at public exhibits and fairs. The number of people reached in this way is large; their attention is called to the merits of the various devices displayed at a time when they have the leisure to examine them—for they visit an exhibit for that very purpose; and demonstrations can be carried on under the most favorable conditions.

The returns from this class of advertising will be in direct proportion to the interest it excites, so that it pays to go to some pains to make your exhibit as attractive as possible. To do so, you first of all need a good booth, and it is the purpose of this article to describe one that has been tested by actual service and found to be highly successful.

In most mechanical exhibits and food fairs, the booths are flimsy structures of a temporary nature, and differing in no marked degree from





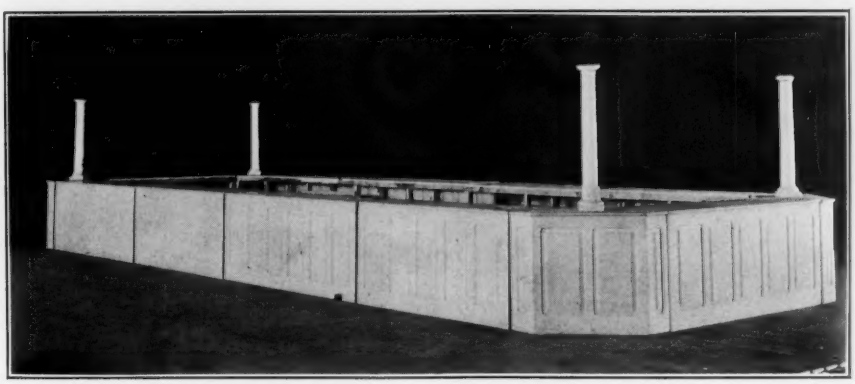

FLOOR SPACE - 43 FT X 13 FT
FLOOR SPACE - 6'x6'
FLOOR SPACE - 10'x13'
FLOOR SPACE - 13'x13'
FLOOR SPACE - 19'x33'
FLOOR SPACE - 8'x19'
FLOOR SPACE - 25'x19'
FLOOR SPACE - 19'x13'
A FEW WAYS OF USING THE SECTIONAL BOOTH, SHOWING ITS ADAPTABILITY TO ALL SHAPES & SIZES OF FLOOR SPACE.
Fig. 2

each other. A more substantial booth set in the midst of these rickety frame-works is a relief to the eye and lends an appearance of permanency to your whole display.

But such a booth as this to be practicable must fulfill certain conditions. It must be capable of being used repeatedly on different occasions, so that the cost for any one exhibit may be slight. This means that it must be easy to set up and take down; it should be "elastic," so that it may be used upon different shaped floor-spaces; it must be strongly built, yet easily transported and stored; and it must be attractive in appearance.

The Narragansett Electric Lighting Co. of Providence, R. I., has had a sectional booth constructed that fulfills all these conditions. It is built of pine, the sides being panelled and painted with white enamel, and consists of eight corner and two rectangular sections. Its cost was approximately one hundred and fifty dollars.

The photographs here reproduced show this booth in actual use. Figure 1 is a detail sketch, illustrating the mechanical construction of its framework, and the method of con-



necting the sections. In Fig. 2 are a few suggestions as to possible arrangements of the booth for different floor space conditions, using all or only a few of the sections.

A booth built as above described should, with good care, and the aid of an occasional coat of paint, last many years and will add little to the cost, and much to the value, of public exhibitions of central station electric appliances.

One great advantage of this construction is its elasticity, as any number of sections desired may be constructed, and it is not necessary to go to large expense at the start. Four corners and four side sections will serve for a small booth and may be added to as required.

A Dollar Idea

THE Tungsten Lamp Specialty Company of Brooklyn uses a contract form which has one feature that might well be incorporated in the central station document.

On the face of the contract are shown two blank rectangular spaces ruled off for diagrams, one to be used for a diagram showing the location of window lights, the other to plot out the position of the outlets in the interior of the store.

Every lighting company has those unfortunate experiences when through honest misunderstanding between the consumer and the company's agent or some other reason the tungsten or the arc lights, or the clusters or the signs have been hung in the wrong place and the customer is disgruntled.

The solicitor calls, works up his prospect, lands his order and then comes the choosing of the location for the equipment. The matter is settled in detail and the instructions pass through the regular channels to the construction or lamp department. When the men undertake to make the installation in accordance with orders, the merchant perhaps has decided that they must go somewhere else.

More trouble! The solicitor has to hurry around and arbitrate.

With the Tungsten Lamp Specialty Company's contract form, where the customer affixes his name, the location of the lamp is fixed. There are no misunderstandings. It is too late for the man to change his mind.

Gain in Income Due to Tungstens

Lowell (Mass.) Electric Light Corporation's Experience with the New Units

"WE find that of the tungsten lamps we have put out, some 40 per cent or so bring us absolutely new business, replacing gas. Of the remaining 60 per cent, at least 40 per cent represents a broadened use of current by old customers," said Mr. Norman T. Wilcox, manager of the Lowell Electric Light Corporation. "Taking the matter all in all, instead of losing gross business as we had thought possible we are making a gain in income due to the use of the tungsten lamps."

Considering the territory served by Mr. Wilcox's company, this statement is significant. The city of Lowell is a "mill town." The bulk of the people are mill operatives—foreigners whose standard of living and frugality make the business of the local merchants one of close profits. Naturally, a large or spectacular use of light is not the common practice; on the contrary, the effort is always toward further economy.

When the tungsten lamp was first offered, the Lowell company was quick to see both its advantages and dangers. The experience of the British lighting companies in allowing the control of the tungsten lamp situation to pass into the hands of contractors and supply men, served as an object lesson. The rental system was finally determined upon for the reason that it has the advantage of keeping the control of the lamp situation in the hands of the central station, and not allowing it to get away to the detriment of the service and mutual interests of the central station and consumer.

"We found that many customers were unwilling to incur the expense incident to an installation of the new lamps," explained Mr. Wilcox in describing his experience, "consequently we devised the rental charge system, and started to put it into effect early last Spring. The result has been eminently satisfactory, and we think will be still more so in the future."

The Lowell company makes a net charge of 25 cents per lamp per month for the 100-watt and 60-watt units, furnishing the shade and holder and doing the wiring for a one-year contract. Current is then sold to the customer at regular rates. All the tungsten lamp contracts are written on the basis of 13 cents gross for the first fifty hours' monthly use of the connected load, the balance of the current being sold at 6 cents per kilowatt hour gross, the whole bill being subject to a discount of 10 per cent for cash. This makes the net figures 11.7 cents and 5.4 cents per kilowatt hour, with a minimum of 25 hours' use per month at 13 cents.

This plan the company believes to be an excellent way of handling the tungsten proposition, especially in the face of very strong competi-

tion. It has the advantage of being flexible, in that the rental charge can be slightly decreased and if the future warrants, can be entirely eliminated when the time is ripe. The company at present gives free renewals of ordinary lamps. The plan is working so successfully that in the neighborhood of 700 lamps have already been installed and the business is increasing rapidly.

To sum up, the policy of the Lowell company is to retain control of the tungsten lamp situation by making such a close selling price on lamps that there is no incentive for the ordinary wireman or local dealer to sell them on the basis of saving in current only. While it is agreed that such a policy is not the most advantageous in all localities—the contractor or dealer frequently being a very strong ally of the lighting company in getting business—this plan has very practical advantages. As Mr. Wilcox said, in closing the interview:

"We believe that our method of handling is more satisfactory to the customer, in that it enables him to light his store better, and in the case of combination gas and electric lighting, the customer is able to light his store entirely by electricity, cutting out the gas."

A Dollar Idea

THE problem of getting houses wired and of keeping owners and real estate dealers alive to the advantages of having their properties equipped with electric service is one which has always given the central station commercial man more or less worry. The scheme of giving to real estate dealers free "to rent" signs upon which notices are printed advising the prospective tenant that the premises are equipped with electric light, has been successfully tried, as has the idea of keeping an electrically lighted bulletin containing lists of vacant wired houses.

The latest idea is the insertion in the Want Columns of the daily papers calling upon those in search of houses to see that the premises are lighted with electricity. This idea has been worked by the Boston Edison Company and also by the Narragansett Electric Lighting Co. of Providence, whose ad is as follows:

> NOTICE THE HOUSES on this page that are wired for electricity; they are modern, hygienic, comfortable. NARRAGANSETT ELECTRIC LIGHTING CO.

The Tungsten in South Bend

The Flat Rate Renewal Proposition Proved so Successful that the Rate is Reduced

IN an article entitled "Flat Rate Tungsten Renewals," appearing in the September issue of SELLING ELECTRICITY, attention was called to the action taken by the Indiana and Michigan Electric Company of South Bend, Indiana, in offering to maintain tungsten lamps at a given monthly rate.

A portion of the South Bend contract form was reproduced, on which the tungsten lamp renewal rates were set forth as follows:

Contract for Lamp Renewals

The subscriber, hereinafter called the purchaser, requests Indiana and Michigan Electric Co., hereinafter called the company, to loan Holophane arcs and lamps of the number, kind and size hereinafter specified, and to furnish all renewals of such lamps, and to maintain and keep said Holophane arcs in a good serviceable condition, in consideration of which the purchaser agrees to pay the company monthly the rate per lamp set out in schedule below:

Lamps of Watts Installed in

Lamps of Watts Installed in

Lamps of Watts Installed in

Lamps of Watts Installed in

Rates Per Lamp, Per Month for Renewals and Cleaning

Tungsten	250	Watt on Chain Pendant	$ .50 Per Month
"	100	" in Cluster or on Drop	.25 " "
"	60	" " " " " "	.25 " "
"	40	" " " " " "	.24 " "
Gem	100	" " " " " "	.10 " "

The above lamps and Holophane arcs are, and are to remain, the property of the company, with the right to enter upon the premises and to remove any and all of said lamps and arcs at the expiration of this agreement, or discontinuance of the supply of electricity.

The date of expiration of this contract shall be the same as the contract between the purchaser and the company for the purchase and supply of electricity.

Accepted:

.....

Purchaser

.....

For Ind. and Mich. Elec. Co

New Contract Form used by the Indiana and Michigan Electric Company

100	watt	tungsten	lamp,	30	cents	per	month
60	"	"	"	27	"	"	"
40	"	"	"	24	"	"	"
100	"	gem	"	10	"	"	"

The aim of the company was to

eliminate all possible detail, to remove every conceivable source of irritation in the process of billing and collecting for current and to prevent the customer from becoming prejudiced against the tungsten lamp merely because at irregular intervals it might be necessary for him to expend a few dollars for new lamps. When one bill covers all costs, collections are vastly simplified and electric light gains in popularity.

A letter just received from the South Bend company gives additional and interesting data on the subject, and showing the actual results of the experiment, demonstrates clearly that tungsten maintenance is practical and good commercial policy.

The flat rate renewal offer has been in force in South Bend since the first of last June. At the end of the first 800-hour period it was found that a reduction could be safely made in the monthly rate on the 100-watt and the 60-watt lamps. Maintenance was therefore offered on both these sizes at 25 cents a month. This was a cut of 5 cents on the 100-watt lamp, and 2 cents on the 60-watt lamp. Also, the 250-watt lamp was added to the list at 50 cents per month. The charge on the 40-watt lamp remained unchanged at 24 cents.

At this time there were on circuit, on this basis, 11 250-watt, 231 100-watt, 152 60-watt and 119 40-watt lamps. The renewals and breakage to date have been 1 250-watt (defective), 21 100-watt, 14 60-watt and 12 40-watt lamps. There are some installations that have burned considerably over 1000 hours without burnout.

Since June first, this company has also sold outright, with fixtures, more than an equal number of tungsten lamps. This has been done without displacing arcs or Nernst lamps, over a thousand of which are burning on the company's lines. Special effort has been made to raise the standard of illumination among the users of carbon filament lamps through the introduction of tungstens, rather than to disturb present high candlepower units. A great many of the latter will, of course, give way to tungsten or some other economical unit eventually, but the other field was chosen as the more promising and profitable.

The maintenance charge on the 250-watt lamp has been left high partly because of the difficulty in securing this size from the manufacturers. Also, owing to the cut in capacity demand it has been deemed inadvisable to lower the maintenance of the 40-watt lamp or to establish a price on the 25-watt size at this time.

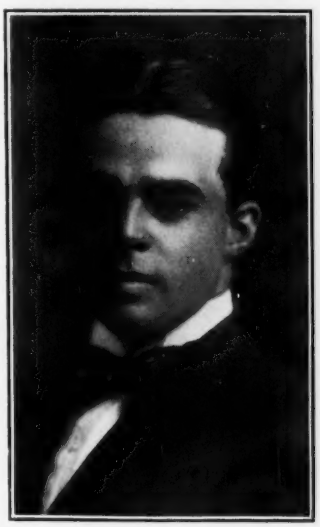
However, when the new business department has waged strong war on the gas consumers and secured the necessary compensation, the price of these two smaller units will in all probability be reduced pro rata. For the tungsten lamp possesses the property of providing a means to overcome the very loss in demand which its introduction among present customers occasions.

Tungsten Lamp Usage

By Albert J. Marshall, Illuminating Engineer

IN many most interesting and capable articles which have been contributed by various engineers and others, from time to time during the past several months, the tungsten lamp's qualifications have been brought out in more or less detail.

Chief among the points considered have been its wonderful efficiency (lumens per watt); its closer approach to day-light color values than the carbon, metallized or tantalum filament lamps; its fragility, and the steps taken to make it strong; its higher intrinsic brilliancy than other forms of incandescent filament lamps which generally necessitates using some form of surrounding medium in order to make same acceptable and not injurious to the eye, and the revolutionary effect that it would have on lighting conditions in general.



A. J. Marshall

So far, tungsten lamps have been used chiefly, almost wholly, for purely utilitarian purposes, little or nothing having been done with a view of using same in installations wherein the aesthetic requirements were of high order. This has been largely due to two causes namely, the fragile condition of the filaments in lamps of small candle-power of the multiple type, which up to comparatively recently could only be used in vertical pendant position, and the apparent blackening or darkening of the bulbs, which, while not generally noticeable when the lamps are burning, is much in evidence when the lamps are cold. The last mentioned defect or shortcoming will have to be remedied before tungsten lamps can hope to be generally used in lighting installations where they must be acceptable in the daylight as well as when lighted at night.

Tungsten lamps, coming into use as they did at about the same time that the lighting interests of the country were beginning more fully to appreciate the desirability of accepting and making use of sensible illuminating engineering principles, added much momentum to this partially formed desire, although their advent has been considered by some people, as being the real turning point for the better in the lighting world. These lamps, however, are but a mere incident in the development of illuminating enginering practice. In all probability, the tungsten lamp will give way in the comparatively near future to some other lamp of higher efficiency, and therefore we can only look upon it as something that lends itself readily to economic usage. The tungsten lamp has not created the illum-

inating engineer, although I will say that it is largely responsible for a number of self-styled engineers who have taken advantage of its efficiency to set forth their ability(?). The real illuminating engineer will be even a greater factor in the lighting world when this lamp has been forgotten. The illuminating engineer is virtually making the lamp and not the lamp the engineer: he uses it as but a means to an end in the same way as he uses other efficient light sources.

Now that the scientific world is alive to the necessity and possibilities of creating light sources of greater efficiencies than heretofore has been dreamed of, it is necessary that the illuminating engineer, if he expects to make use of such illuminants, be in a position to anticipate development, so that in designing lighting systems he may arrange for their future use. For a lighting system must not only be efficient when installed, but should be adaptable to future developments. Further, the illuminating engineer does not want to consider only the "efficiency" (economy) of tungsten lamps, in so far as using but a small amount of current to each square foot of given space to produce a given intensity of illumination, but he also must devise ways and means of utilizing this "efficiency" in a manner calculated to be effective, harmonious and not injurious to the eye.

It is a generally recognized fact that almost all modern artificial light sources are, to a large measure, the cause of much eye trouble, not only as to their placement in general usage, but also as to their great brilliancy. Inasmuch as the tungsten lamp is of higher intrinsic brilliancy than other incandescent electric lamps, it will be necessary, if we desire to utilize the light rays from this lamp so that same will not be injurious to the eye, to soften and diffuse the rays to a much greater degree than is the custom at this writing with other similar lamps. The brilliancy of all of our modern illuminants is far greater than the eye should be compelled to stand, but the "efficiency" of these other units has not been generally considered great enough to permit the "sacrifice" of a percentage of their rays to obtain satisfactory diffusion. With the gain of "efficiency" in the tungsten lamp, and its considerably greater brilliancy, it offers an excellent opportunity for putting into effect the much needed improvements in this direction Further, many lighting effects which heretofore have been considered extravagant, can now be obtained without offending "efficiency." Light rays from this lamp can be, as it was formerly termed, "wasted" in order that certain effects may be accomplished, thus permitting more attention being given to aesthetic requirements. Besides the intensity of illumination may now be increased in many classes of work where it is, to my mind, desirable. This intensity of illumination, however, in being increased, should also be properly softened—diffused.

The tungsten lamp, therefore, comes as a welcome friend to the aid of the illuminating engineer who is desirous of carrying out principles which he feels are correct, and for such assistance, much thanks!

What the Rating of an Incandescent Lamp Really Means

By T. W. Rolph, I. E.

(The following is the first of a series of articles on the Principles of Illuminating Engineering by Mr. T. W. Rolph. Mr. Rolph, while a young man, has already made his name known in the profession through his papers before the Illuminating Engineering Society. His articles in SELLING ELECTRICITY will treat of basic principles — the things a solicitor needs to know — and they will be written in straightforward, understandable English. Illuminating Engineering has suffered through a popular misconception. The solicitor has been inclined to look upon it as a mass of complex technical detail. Mr. Rolph strips it bare and boils it down ready for practical application, and sets forth the fundamentals just as the solicitor should be able to present them to his customers. We congratulate ourselves upon having secured this series of articles, knowing that they will be of great practical benefit to every reader of SELLING ELECTRICITY — Ed.)

UP to a few years ago, the central station man was interested principally in the production of light. He did not worry much about how the light was used. It was not a matter of importance to him whether his customers lighted their show windows with bare lamps scattered about the window or whether they used the modern method of concealing the units and using powerful reflectors to throw the light upon the goods.

Conditions have changed, however. The illuminating engineer has come into the field with his startling statements about the immense quantity of light which is wasted. Furthermore, he has backed up his statements and people are beginning to realize that what they want is illumination and not light. As people become educated to this, they are beginning to demand more and more of central stations that their lighting equipment be as efficient as possible.

Let us consider then why it is that plenty of light placed in a room will not give proper illumination unless the lights are properly placed and equipped. First, we must consider the light which a bare 16 cp. lamp gives. We call this lamp a 16 cp. lamp, but it would be well to know exactly what 16 cp. means. The unit candle-power is a unit of light intensity and not of quantity of light. This is an important distinction. Intensity may be compared to height or depth.

The depth of a well, for instance, does not represent the quantity of water in the well; it represents only the distance which this water extends in one direction. To obtain the total quantity, we must also know the square feet of surface of the water. Or, to take another case familiar to the central station man, the number of volts in a line does not represent the power passing through the line; it is only a measure of what we might call intensity. To obtain the power, this intensity must be multiplied by another quantity, the amperage, and we would then obtain watts or true power.

Candle-power, then, is only light intensity and not quantity of light. In-

NOTE: On page 179 the three cuts designated as Tantalum (1), Tungsten 100-watt (2), and Tungsten 40- and 60-watt (3), should be Gem (1), Tantalum (2) and Tungsten (3) filaments.

tensity, however, is a measure in one direction only, and the question at once arises, does a 16 cp. lamp give 16 candle-power in all directions, and if not, in what direction does it give 16 cp.? The answer, as we all understand, is that the lamp gives 16 cp. only at the horizontal: at the vertical or directly downward, the intensity is only 7 cp.

Fig. 1 shows the photometric curve of a 16 cp. lamp. This means that

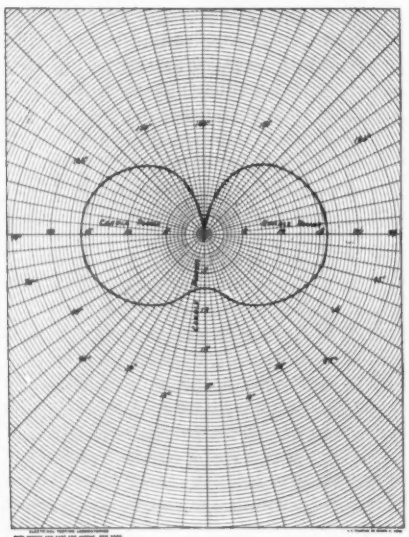


Fig. 1. Photometric Curve of Light Distribution of Ordinary 16cp. Lamp

it shows the distribution of light about the lamp; in other words, the light intensity or candle-power in any direction. It is a very convenient fact that the candlepower of an incandescent lamp is approximately the same in any direction in a horizontal plane when the lamp is vertical. The curve shows that the lamp gives 16 cp. horizontally, which means that it gives 16 cp. in every direction horizontally The curve shows 14 cp. at an angle of 30 degrees below the horizontal. This means that the lamp gives 14 cp. in all directions at an angle 30 degrees below the horizontal. Care should be taken to avoid confusing any idea of distance with candle-power. The quantity which varies with distance is illumination, or the brightness of a surface lighted by the rays of light. The candle-power, or intensity of light, is the same no matter how far the observer may be from the lamp.

It will be interesting to find what the average candle-power of such a lamp is, since it is evident that it must be less than 16. In finding this average, complications arise, and to understand these, a simple analogy will be useful. Consider a hollow globe with zones laid out upon it similar to the zones of the earth. Suppose we have a 16 cp. lamp at the center of such a globe. At the equator the light intensity is 16 cp. This means that it is 16 cp. in all directions at the equator. At some other horizontal circle, such as the Arctic circle, the intensity is perhaps 10 cp. This means that it is 10 cp. in all directions at this Arctic circle. But the Arctic circle is very much smaller than the equator, and it is at once evident that the candle-power at the horizontal represents a much larger quantity of light than the candle-power at the Arctic circle. It follows then, that in taking the average candle-power of a lamp, we must give the candle-powers nearest the horizontal much more weight than the candle-powers near the vertical.

There are various methods for taking this average value, each one of which gives the candle-powers from the horizontal to the vertical less and less value in determining the average.

The average candle-power of a lamp, we call the mean spherical candle-power. The average candle-power below the horizontal we call the mean lower hemispherical candle-power. While mean spherical candle-power is still a measure of light intensity, since it is candle-power, it truly represents quantity of light since it is the average throughout 360 degrees and in every sphere there are 360 degrees. No matter what the light sources are, the mean spherical candle-powers will represent truly the comparative quantities of light which the light sources give. The mean spherical candle-power of a 16 cp. lamp is 13.2. In other words, it is 82 1-2 per cent of the rated candle-power or the candle-power at the horizontal.

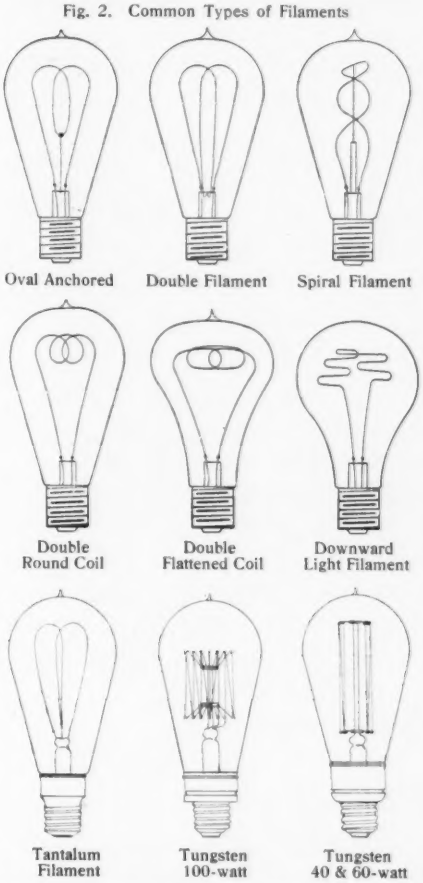
This quantity, .825, is what is termed the reduction factor of the lamp. It is the ratio of the mean spherical candle-power to the horizontal candle-power. It is evident that the reduction factor will vary with different types of lamps, due to the fact that the filaments are different shapes, giving different photometric curves.

Fig. 2 illustrates a few of the common types of filaments and we give below a table showing the reduction factors of various types:

Type of Filament.	Reduction Factor
Oval anchored filament	.825
Double filament	.808
Spiral filament	.914
Double round coil	.884
Double flattened coil	.974
Downward light filament	1.064
Gem, 50-watt, 20-cp. filament	.825
Gem, 100, 125, 187 & 250-watt filament	.820
Tantalum filament	.790
Tungsten 4-loop 40 & 60 watt	.763
Tungsten 4-loop 100 watt	.790

Notice that in the downward light filament the reduction factor is greater than 1. In other words, the average candle-power of the lamp is greater than the candle-power at the horizontal. A 16 cp. lamp of this type, however, does not give 16 cp. at the horizontal but 16 cp. downward,

Fig. 2. Common Types of Filaments



for the manufacturers very naturally rate their lamps at the maximum candle-power.

The tantalum lamp from the peculiar shape of its filament has a very low reduction factor compared with the Gem. This means that a 20 cp. tantalum lamp is not giving as much light as a 20 cp. Gem lamp. Tungsten

lamps, also, due to the shape of the filament, have low reduction factors. None of the factors of the common types of lamps vary from each other more than 6 or 7 per cent, however, so that the total quantity of light which the ordinary types of incandescent lamps give is very nearly the same for lamps of the same candle-power.

Today innumerable devices are used to change the distribution of light about a lamp. The modern well-designed lighting system makes use of these devices so that the mean spherical candle-power of a lamp is of more importance than the horizontal candle-power. The lamp manufacturers, however, continue to rate their lamps at the maximum candle-power. We may hope that before many years they will realize the desirability of adopting mean spherical cp. as the standard rating, thereby making the rating of a lamp a true statement of its light-giving value.

Low Voltage Tungstens

Central stations have not taken a great deal of interest in the low voltage tungsten lamps, except as it is used in series for street lighting, yet there are numerous applications of this lamp that are fast coming into use. These lamps are operated on ignition storage batteries, or low tension ignition magnetos or ignition generators, the last method being the best. Owing to the heavy filament, they are less fragile than the high voltage tungstens, manufacturers claiming that they are even less liable to breakage than the carbon filament lamps. One company is now making these lamps in voltage ranging from 4 to 30, and up to almost any desired candle-power.

Perhaps their most useful application is for train lighting, to take the place of the carbon lamps now in use. These lamps will effect an immense saving to railroads if they prove satisfactory; running on about a third of the current necessary for the carbon lamps.

They will, in all probability, be largely used for dental and medical use, not heating up as do the high-voltage lamps, especially in the low candle-powers.

Low voltage miniature tungstens will be used in small pocket lamps or flashlights, and are, in fact, far superior in almost every instance where lamps are run by dry or storage batteries. If the cost can be reduced, their brilliance will probably bring them into general use for signs. The automobile and motor-boat owners are beginning to welcome the low-voltage tungstens, as a small storage battery will run a complete equipment for car or boat. A lamp of about 20 cp. with a proper reflector will equal, if not excel, the ordinary acetylene searchlight, and the saving in time, temper, and money is well worth while.

Tungsten—"The Electric Welsbach"

By H. Thurston Owens
Associate Member, The American Gas Institute

ALTHOUGH the tungsten lamp requires but half the energy of its predecessor, through its use the total output of a company can be largely increased. Efficiency creates demand.

The gas industry faced a similar problem at the time of the introduction of the mantle lamp and although the use of this burner was not accepted graciously at first, today it is spoken of as the salvation of gas lighting. In many companies, especially the smaller ones, the output of gas was considerably curtailed but it is safe to say that these companies did not maintain a selling organization.

A reduction in price is always followed by an increase in sales and the real point to be considered is how soon you will be able to educate the consumer to make greater use of the more economical appliances.

How about the sales of gas for lighting since the introduction of mantle business? During the past ten years the electric interests have not been idle. The average increase in sales of electricity for the past five years will approximate 15 per cent per year compounded!

Did the sales of gas for lighting show a loss? No!

Did the sales of gas per capital for lighting show a loss? No!

To illustrate the point more fully let us take a number of cities in various parts of the country and compare the conditions for the year 1898 as against 1907. The figures have been derived from Brown's Directory of Gas Companies, and the companies were selected to show results which would represent the majority of cases and for that reason none were taken which rank among the first fifteen in size.

Mantles had, of course, been in use for a considerable period prior to 1898 but there has been a remarkable increase in their use since that time.

The table on next page shows very clearly the remarkable growth of the business and the importance of a selling organization.

In 1898 the percentage of sales for lighting ranged from 59 to 97 per cent of the total output, while in 1907 the figures were 25 to 70 per cent.

The largest sales per capita in the early period were 1700 feet, while during the year 1907 they reached 4000 feet.

Of the twelve cities two show a decrease while in the others the gain has been not alone healthy but in some cases remarkable.

There have been several factors contributing to the results in addition to the increased use of mantle burners, but aside from increase in population they have all been along lines of higher efficiency. The public is being educated to use their light sources to better advantage.

Table 1.

Showing population, percentage of sales for lighting purposes and sales per capita for lighting for the years 1898 and 1907.

Location of City	1898			1907		
	Population	Percent Lighting	Sales per Capita	Population	Percent Lighting	Sales per Capita
Middle West	35,000	59	674	40,000	55	2420
South	30,000	90	450	60,000	25	312
Pacific Coast	30,000	85	1700	42,000	25	1268
Northwest	30,000	75	500	33,000	32	1429
East	22,000	85	1120	27,000	60	1844
South	40,000	97	1697	45,000	40	2133
Middle West	60,000	79	1183	75,000	60	1600
Pacific Coast	70,000	85	728	72,500	45	2214
East	80,000	75	890	100,000	65	1777
Pacific Coast	100,000	80	1440	275,000	40	4000
East	120,000	80	1333	125,000	40	1680
Middle West	215,000	86	1400	230,000	70	1663

The price of gas has been reduced and the decrease in cost of a commodity to the consumer will always increase its use and thereby benefit the producer.

The situation in the electric field is slightly different from that which confronted the gas interests in the past and that is the load factor.

Merchants appreciate the value of good store lighting, especially in the windows and therefore the situation offers a splendid opportunity to reduce the peak load and then look for returns from a long hour basis, by increasing the period of window lighting.

Is it not safe to assume that a merchant will spend the amount saved on his regular installation in order to have his windows lighted every night instead of only one?

The same applies to residence lighting, for consumers as a whole compare their monthly bills and if they do not find an increase they will gladly use more lighting and over longer periods.

The problem does not confine itself to operating costs on the score of peak load alone, however, for great strides have been made in the gas business, perfecting the inverted lamp and pushing it as well, so that there is still a wide margin in favor of gas between the cost of the two. (See American Gas Light Journal, July 20, 1908.) The old carbon lamp or even its immediate successor, the Gem, cannot produce illumination at anything like the cost of the inverted gas lamp and the result is that electric lighting is being lost to this new and efficient competitor.

The tungsten lamp takes the same place in electric lighting which the mantle lamp has achieved in the field of gas, and it is indeed fortunate that it has arrived at a time when the gas interests are fully alive to the situation.

The Selling End of the Business

Announcement of an Important Series of Articles by a Leader in the Field of Commercial Advertising

UNDER the above caption, we shall begin next month the publication of a series of articles by Mr. George B. Spencer — a writer whose name is well known in the business world through his contributions to *System Magazine*, *The Business World* and other commercial journals.

In presenting Mr. Spencer to the electrical industry SELLING ELECTRICITY takes a long step in advance. Heretofore central station men have looked almost wholly within their own field for experience and guidance. Under the plea that "our business is different" they have been apparently blind to the truth that "business is business" regardless of environment or circumstances. Mr. Spencer's articles are the first we have secured from the writers in the great field of business.

Mr. George B. Spencer

While these articles are by a man who pretends to no particular knowledge of the electrical industry, our readers will find Mr. Spencer's words of the most intimate value to their own business because in what he is writing for us he deals only with proved facts which have been practically demonstrated from business experience.

Mr. Spencer has successfully been the head of the selling department of the largest factory of its kind in America; he has been one of the staff of experts consulted by *System Magazine*; he has been one of the leading writers for the largest advertising agency in the world and he is today acting as sales counsel for some of the largest merchandising concerns in New York. His experience covers the successful selling of a wide range of commodities and while each of these demanded individual treatment, the broad principles of commercial success in all cases were the same.

These principles Mr. Spencer will present in the pages of SELLING ELECTRICITY.

Tungsten Lamp Clusters for Store Lighting

By John G. Larned

North Shore Electric Co., Chicago

THERE seems to be a great diversity of opinion as to the best methods to pursue in securing tungsten lamp business in stores, with a view of supplanting individual gas and gasoline lighting systems. After a very thorough and careful investigation regarding the efficiency of the various tungsten lamp clusters and prices of same, we decided to adopt a Federal fixture equipped with four 60-watt tungsten lamps.

Our store rate on a meter basis is 10c. per kilowatt hour.

We furnish, install and connect the indoor fixture complete with lamps for ten dollars. This price does not include any interior wiring. We allow a rebate of one-half cent per kilowatt hour in lieu of making free lamp renewals. If the premises of the prospective customer are wired, we will install these clusters on a thirty days' trial. This proves most satisfactory, as the majority of the prospective customers in smaller towns must be "shown" before they will make an investment in fixtures.

Under the rates mentioned, the four 60-watt tungsten cluster most successfully replaces the four-mantle gas burner, both as to quality of light and also as to cost of operation.

We furnish, wire for and install these fixtures under a two-year contract on a flat rate basis, as follows:

Four 60-watt lamps to burn from dark to 10 p. m. 6 days per week, $1 per week per cluster.

Four 60-watt lamps to burn from dark to 12 p. m. 1 day per week, $1 per week per cluster.

Four 60-watt lamps to burn from dark to 12 p. m. 7 days per week, $1.35 per week per cluster.

This price also includes maintenance.

We pay our solicitors a commission of $1.00 for each tungsten cluster contracted for to replace a four-mantle gas burner. We are also sending out a large amount of advertising matter on tungsten lamp fixtures and are making a very thorough personal canvass, with a view to replacing gas and gasoline.

We have had the co-operation of the manufacturers of tungsten lamps, whose representatives call upon our larger prospective customers, who still use gas, the result of which was that in one case we secured an installation of ninety-four 60-watt tungsten lamp clusters to replace an equal number of four-mantle Humphrey gas lamps. This particular customer now uses our service continuously during the day and also three nights a week. He is paying us about $80 per month more than formerly and is also effecting a saving of $60 per month over his old system of lighting.

We also have the hearty co-operation of the local wiring contractors in pushing the tungsten lamps, and whenever possible, we give the wiring job to them.

We impress upon those customers

who are using carbon filament lamps the fact that by replacing the old lamps with tungsten lamps they will get three times as much light for the same money. Consequently, we do not have a falling off in income on our present store lighting business.

We recommend that the 60-watt tungsten lamp be adopted as the standard unit for store lighting.

No Tungstens in this Town

Fort Valley, Georgia, Has an Ordinance Against Them

THE means adopted by politicians to justify municipal ownership are many and weird, but low-water mark seems to have been reached in Fort Valley, Ga., where a Lighting Board consisting of the honorable mayor, the assanine manager of the municipal lighting plant and two councilmen of doubtful sanity passed the following unique ordinance:

Be it resolved by the Water and Light Commissioners that from and after Oct. 15th, 1908, no firm, person or corporation using current from city lighting plant shall be allowed to use any other lamp, except the carbon and carbon filament, the price fixed for current being for this lamp. Any firm, person or corporation found guilty of violating this rule will be fined $10.00 for the first offence, and for the second offence will be disconnected from the main and refused further service from said plant.

WATER & LIGHT COMMISSIONERS.

In slang of the day: "Can you beat it?"

The incident should prove of profound interest to alienists or others concerned with the vagaries of unbalanced brains; to the lighting fraternity it is but another proof of the utter absurdity of municipal ownership methods.

The ordinance was the direct result of the use, by a Mr. L. R. Prator, of some tungsten lamps on the municipal circuits. Mr. Prator is a leading merchant of the town. As soon as the plant manager learned that the tungstens had been installed, he convened his board, passed his fool ordinance and now sits back satisfied that everybody must pay for electric light at the rate of at least 3.1 watts per candle.

Consider, for a moment, the effect upon public, press and municipal officers if a privately owned lighting company could and should endeavor to keep tungstens off its lines.

Consider, also the moral obliqueness of the man who, to justify a municipal enterprise which they have neither the brains nor training to conduct successfully on a legitimate basis will legislate efficiency off the earth for the purpose of doubling their income.

The incident is an excellent example of the way municipal ownership works out in practice.

Fighting Gas with Tungsten in Brooklyn

What Mr. M. S. Seelman, Jr., has Accomplished

IN every large town and in every small city there are those merchants, who plead the size of their town as an excuse for insufficient lighting. They say: "We can't afford to light up our stores and windows, to outline our building, to burn an electric sign, as the men in the big cities do. Business in this town does not justify it."

As bearing on this phase of the Central Station problem the tungsten campaign which has been carried on in Brooklyn for the last eight months is of particular interest.

The record of the Tungsten Lamp Specialty Company has already received considerable publicity, but it has been largely viewed as the noteworthy accomplishment of a prosperous central station in a big city, and of no vital interest to the man who runs a plant in a small city or town. To the contrary, the methods which have been employed by the Brooklyn Edison Company through their tungsten lamp agency are applicable wherever there are gas consumers to be solicited and should be an inspiration to every man who sells electricity to small merchants.

All men who conduct small stores —grocery, dry goods, butcher, delicatessen, shoe stores and the like—are brothers in heart and pocket-book, and the mental attitude of five such in one town is close akin to the point of view of five more in a neighboring city. Life is much the same east and west, north and south, and men selling similar goods at similar profits are hitching their wagons to stars of about the same altitude and brilliancy. Dollar bills bear an equal degree of fascination to them, be they in town or city, and the arguments of the electric light solicitation carry much the same weight.

The man with the little shop on a back street in the big city, perhaps has more people to draw on for his trade than the town merchant, but his rent and his fixed charges are greater and he fights his fight about on a par with his brother in the small settlement. Inasmuch, therefore, as the entire campaign of the Tungsten Lamp Specialty Co. has been directed toward exclusive gas uses, mostly in small stores, it is evident that similar methods employed in small cities might be expected to show about the same success.

Last spring the Brooklyn Edison Company, to meet the loss of revenue incidental to the introduction of tungsten lamps, decided to campaign for new business among the small stores. There were literally hundreds of such prospects whom the company had never been able to reach since the $15, $20 or $25 a month which the use of carbon filament lamps would have cost them was more than they could afford. The greater efficiency of the tungsten lamp brought the proposition down to the gas cost basis.

Of course, the element which is always hardest to overcome in winning over small customers is the initial ex-

pense of wiring for electricity and it was, therefore, determined that the co-operation of the local contractors should be enlisted, so that a flat rate proposition could be made covering a complete installation of lamps, fixtures, wiring, etc., for so much an outlet. Bids were received from contractors and fixture houses and it was found that contracts could be taken for $7.00 an outlet and 50 cents a switch outlet, the wires to be run in moulding. The fixtures adopted as standard were plain, stiff pendants with Holophane reflectors, and at this price a fair margin was reserved to cover the sales and office costs.

To handle this campaign a separate corporation was organized, known as the Tungsten Lamp Specialty Co., and Mr. M. S. Seelman, Jr., took charge of the proposition, with an independent sales force, opening up an office away from the Edison Co. Salesmen were hired and sent out to canvass the city with explicit instructions to solicit only gas consumers The policy of the company was to let the tungsten lamp make its own way for the time being among those already using electric light in some form, and to devote its entire attention to securing new customers among those small merchants who had heretofore considered the cost of electric light too great.

In this manner the Brooklyn Edison Co. planned to counterbalance the inevitable loss in revenue incidental to the introduction of tungsten efficiency among present customers.

The salesmen were instructed to push the 100-watt lamp and to sell the 60 and 40-watt lamps only when they were especially called for by some exceptional conditions. As a result, 95 per cent of the equipments have been made with 100-watt lamps. Holophane reflector No. 7391 has been used in the majority of cases.

Here is the record of achievement in the sale of tungsten lamps to small merchants during the period from April 1st to October 24th:

Number of contracts secured, 433.

Number of lamps sold under these contracts, 2713.

Amount in sales represented by these contracts, $19,434.07.

Number of lamps (some with fixtures and reflectors) sold outright to contractors, 3648.

The revenue to the Edison Company from these new customers averages so far $10.33 per month per customer. At the end of five months' work, it was estimated that the efforts of the Tungsten Lamp Specialty Co. had added to the estimated revenue of the Edison Co. new business in excess of $65,000 annually.

All this has been done by an entirely self-supporting organization, for the profit per lamp installed has proved sufficient to finance the undertaking.

Mr. Seelman, in talking of the indirect results of the campaign, in an interview said: "An important feature of the Tungsten Lamp Specialty Company's work as it has developed, consists in the education and encouragement of electrical contractors to the end that they become themselves active solicitors among gas consumers, practically doing the same kind of work that the Tungsten Company is doing. These efforts have resulted in marked activity among a number of Brooklyn contractors along the line

of securing new tungsten equipments. Several contractors have recently engaged solicitors to canvass solely on this class of work. About May 1st the Edison Company called a meeting of the Brooklyn contractors, at which was explained to them the fact that the tungsten lamp presented opportunity for their securing a large amount of business hitherto unattainable and that the new Tungsten Company, so far from being a competitor, would co-operate with them in every reasonable way. This has been followed up, so that the Tungsten Company is in constant touch with many contractors, supplying them with information and assistance and selling them lamps, appropriate fixtures, etc., at a low figure.

"Another feature of the campaign that may prove of interest leads to a rather heretical conclusion. In the beginning, in accordance with good illuminating engineering practice, the use of frosted tip lamps was generally advised. It was soon found, however, not only that the preference of the storekeeper was for the clear lamp, but that in a majority of cases, used in connection with the bowl reflector, it afforded better illumination, free from any of the unpleasant effects predicted by enthusiastic advocates of the frosted tip. Ninety-one per cent of all the lamps issued by this company in five months have been clear glass."

The 433 contracts have been secured largely from small merchants, saloons, barbers, drug stores, confectioners, grocers, shoe stores, dry goods stores, cigar stores, butchers, delicatessen stores and restaurants named in order of their number. They are the same breed of storekeepers found in every city on the lines of the gas company. These men are, many of them, not susceptible to a proposition for electric light if it is to cost them more than gas; but they may be approached with tungsten figures successfully.

The experience of the Tungsten Lamp Specialty Company and the record of their accomplishments in Brooklyn should be studied and the lesson should be applied by every central station man who seeks a way to turn the tungsten efficiency into gain for his company.

The commercial load in the big city is composed of individual stores just as it is in the small city. The same methods successful with the small merchant in the small city are applicable to the small merchant in the town.

The walls of skyscrapers are built brick by brick, stone by stone, just as are the walls of a one-story house, and the tungsten lamp will win over gas consumers in a small city in the same way and with the same success that it has in Brooklyn.

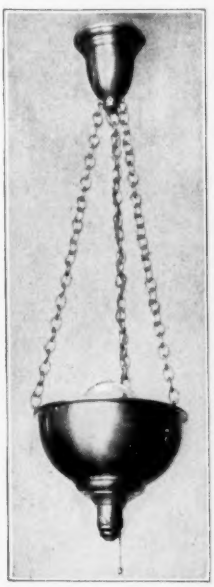
Indirect Illumination

By Augustus D. Curtis

INDIRECT illumination is acknowledged by all who make a study of artificial interior illumination, as the most æsthetic and modern method. With this form of illumination, the light source is concealed and usually depends upon reflection from ceiling, walls or other reflecting sources for an even illumination of the room. Its practical application has been limited, however, owing to the great loss or absorption of light.

Various attempts have been made to solve this problem and there are a considerable number of installations in which indirect illumination is applied in different ways. The most successful heretofore has been that in which the light source is hidden behind or concealed around the edge of brackets, and the light reflected towards the ceiling of the room. Another method which produces very pleasing effects is that in which the light is reflected through art glass in the ceilings of the room. Either of these methods produces very pleasing results and wherever expense is not to be considered, will undoubtedly grow more and more in favor.

Recent developments have been effected, however, that probably mark an epoch in interior illumination. They make commercially available—that is, bring within the reach of the person of ordinary means—this method or system of indirect illumination. In this work the designers have been greatly aided by valuable



Fixture Consisting of Tungsten Lamp, X-Ray Reflector and Chain Support

Interior Lighted by Indirect Method

suggestions from members of the Illuminating Engineering Society, and the Chicago Opthalmological Society, who are emphatic in the assertion that most eye troubles are caused by the present method of artificial illumination, in which the delicate mechanisms and nerves of the eye are subjected to the direct rays of the intensely brilliant modern lighting units.

The successful solving of this problem and its practical working out depended upon two things:

First, a light of high candle-power at low cost.

Second, a reflecting surface that would give the first reflection of light upward without material loss.

With the tungsten lamp we have the desired light source.

The reflecting surface surrounding the lamp or mantle offered no difficulties, that problem having been solved already by the X-Ray reflector.

The perfected design is of a bell shape and contains peculiar circular and vertical corrugations. The indirect lighting units worked out consist of this scientifically correct bell-shaped corrugated mirror reflector, fitting in a spun brass casing, suspended by chains or supported from below on the fixture.

Direct light rays from the filament of the lamp striking the eye is the cause of much trouble and discomfort. We all know that a rough paper which partially breaks up these rays by diffused reflection is far preferable to a glazed surface, as is so commonly used in our magazines. The rays of light from these fixtures, striking first the reflecting surface of the ceiling, lose their injurious effects and the eye-comfort experienced by this method of illumination is certainly very noticeable.

Indirect illumination is not only more æsthetic, but even enables one to see better. While it is true that there is a loss of light, another factor enters to over-balance this, for the more easily details can be seen, the more effective is the illumination. When there is a bright naked lamp in front of the eye, the pupils contract and the eye takes in less of the light, and objects illumined are not seen so clearly as with less light and a wide-open pupil. The absence of a brilliant source of light in the line of vision, enables the iris to relax, admitting more light to the retina of the eye. Hence, the fact that there may be less light with indirect illumination does not mean that we see less clearly, for while the actual illumination in foot-candles may be lowered, the illumination for vision is increased. Consequently, we really see better.

Of course this system of illumination is not as practical with beamed ceilings or those of dark tint, but these are in the minority. There are at present many experimental installations of this system in use among professional and business men in their residences and offices. Without exception, they are enthusiastic in its praise, and are so impressed with the eye-comfort derived by its use that they would go back to the old system of illumination only under protest.

The fixtures can be installed in single units or multiples thereof, either electric, gas or combinations or both and it is practical to illuminate in this way, not only residences, but halls and auditoriums.

A unit of one reflector and one

100-watt tungsten lamp (about one-half watt per square foot) gives a beautiful illumination in a room up to 15 feet square. This consumption makes the cost very reasonable, being from one-half to one cent per hour. The cost of illumination and maintenance does not, we believe, exceed that of the ordinary methods now in vogue.

The benefits and comforts are unquestionably so far superior that to many the cost would not be a matter of consideration. The æsthetic influence in the home is greatly added to by the quieting effects and the great eye-comfort derived from concealed illumination.

With tungsten efficiency the indirect lighting of interiors has become commercially practical, and we anticipate in the near future a growing demand for eye-comfort through the shielding of the modern intensely brilliant light centers.

A Dollar Idea

By G. W. Barlow
Contract Agent Indiana and Michigan Electric Company
South Bend, Ind.

IN localities where the sale of irons has been pushed for two or three consecutive seasons, it is discouraging for solicitors to call upon customer after customer who already has an iron. To obviate this, have the cashiers tactfully ask customers, upon payment of bills, whether or not they have an iron, making note of same on stub of bill retained, while they are receipting. Such a live follow-up list has been instrumental in placing 614 6-lb. irons and 13 12- and 20-lb. irons, this season, in territory supposedly covered, and by two regular solicitors who do this work in addition to their regular routine.

What the Lamp Makers Say

EACH of the various managers of lamp companies selling tungsten lamps was asked to give "one new thought on the commercial aspect of the tungsten lamp." Here are their answers. They are valuable as containing the essence of each manufacturer's experience in dealing with hundreds of lamp users and lamp dealers.

N. L. NORRIS.

Secretary and General Manager, The Banner Electric Company, Youngstown, O.

"To advance one new thought on the commercial aspect of the tungsten lamp seems to me to be rather a difficult proposition, as it seems that almost everything has been thought of in the way of an argument to induce the central station people to adopt the use of tungsten lamps. Personally, I firmly believe that the Central Station manager, who looks upon the use of tungsten lamps in an indifferent manner, or who puts in his time antagonizing the adoption of tungsten lamps, is wasting time which he had better use in figuring out some plan by which he can adapt his business to the use of tungsten lamps, and get in line and in sympathy with the general march of progress, which is being made along the lines of better illumination."

H. H. CUDMORE.

Sales Manager, The Brilliant Electric Company, Cleveland, Ohio.

"The tungsten lamp fulfils that which has been sought for years and years—better light at less cost. Nor is this a momentary demand. The tungsten lamp is here to stay, and half a dozen great factories have already been dismantled to put in tungsten lamp-making equipment, which insures the permanency of the tungsten lamp.

"And that final arbiter—public opinion—further insures it, because the universal expression is that the tungsten marks the best development in illumination since artificial lighting began.

J. C. FISH.

President, The Shelby Electric Company, Shelby, Ohio.

"The longer people defer using tungsten lamps the more money they are out. The only excuse anyone has for not using them is the price of the lamp. This appears high to some, but when the methods of manufacturing are taken into consideration the prices at which tungsten lamps are sold now are reasonable and we do not look for further reduction in the price for some time to come unless there is some radical change in the cost of manufacturing."

A. S. TERRY.

Treasurer, Sunbeam Incandescent Lamp Company.

"It is my opinion that the marketing of tungsten lamps will have to be done through contractors, if they are going to be introduced to any great extent, as central station managers cannot afford to have too many lamps on their lines under present conditions.

The only thing for the central station manager to do, in view of the fact that the tungsten lamp has come to stay, is to hustle and get enough new business to take up the capacity of his plant so that the full income on the basis of the income received from tungsten lamps will be equal to the present income on the basis of carbon filament lamps. When this point is reached the profit to the central station manager will be as good as it is now."

Jovians at Buffalo

The sixth annual meeting of the Rejuvenated Sons of Jove, held at Buffalo, October 14th, 15th and 16th was a roaring success from badger fight to banquet.

Firstly, the Buffalo Jovians cannot be congratulated too highly both for the elaborate preparations they made and for the genuine hospitality shown during the two days of the meeting.

Here is the program that was put through with such great success:

Wednesday, October 14.

8:00 P. M. Reception, Iroquois Hotel.

10:30 P. M. Badger Fight. Arizona Badger and Boston Bull Dog.

Thursday, October 15.

9:00 A. M. Little Journey to the Roycroft Shop at East Aurora. Heart-to-Heart talk by Elbert Hubbard.

10:00 A. M. Rubberneck Ride around Buffalo.

1:00 P. M. Luncheon, Iroquois Hotel.

2:30 P. M. Business Session, Scottish Rite Cathedral. 164 Delaware Avenue. Address of Welcome, Col. Francis G. Ward, No. 888, Commissioner of Public Works, Buffalo, N. Y.

8:00 P. M. Rejuvenation and Joviation, Scottish Rite Cathedral.

Friday, October 16.

10:00 A. M. Business Session, Scottish Rite Cathedral.

12:30 P. M. Luncheon, Buffalo Club.

2:30 P. M. Election and Installation of Officers, Scottish Rite Cathedral.

7:30 P. M. Banquet, Iroquois Hotel.

The Rejuvenation was a beautiful spectacle and any doubt that may have been felt as to the success of the ritual or "stunts" has flown from the minds of the Jovians present.

J. Robert Crouse, Number 260, was elected the Seventh Jupiter and as such made a real hit.

The other new officers are:

Neptune,	James R. Strong,	742, New York City.
Pluto,	John W. Brooks,	254, Solvay, N. Y.
Vulcan,	Holmer E. Niesz,	306, Chicago, Ill.
Mercury,	C. B. Roulet,	213, Dallas, Texas.
Hercules,	J. F. Dostal,	1102, Denver, Col.
Mars,	W. A. Wayman,	1166, St. Louis, Mo.
Apollo,	E. D. McCarthy,	589, Buffalo, N. Y.
Avrenim,	T. E. Bibbins,	857, San Francisco, Cal.

Edward D. Strickland, No. 599, Buffalo, N. Y., was appointed National Organizer and Secretary to Jupiter, with headquarters at Cleveland, Ohio.

This Congress is a strong one and should be a very material aid in making the standing of the order even stronger than it now is.

At the annual meeting it was decided to limit the life membership to fifty; and fourteen Jovians thereupon became life members by the payment of the twenty-five dollars. It was announced that the membership is now over eighteen hundred.

One of the most unique and attractive features of the convention was the electric representation of the insignia of the Rejuvenated Sons of Jove, which covered half of the Main Street front of the Iroquois Hotel. The emblem proper was 15 feet high, with the figure of Lucifer, the God of Light, worked out in red lights, surrounded by a double circle of white lights, and suspended from the top of the two-story building by fifty strings of multi-colored lights. Ten thousand lights were used in the illumination of this decoration.

J. Robert Crouse, Seventh Jupiter

News and Reviews

Current Items of Interest to Commercial Men

New N. E. L. A. Branch

The employees of the Commonwealth Edison Company, Chicago, have organized a branch of the National Electric Light Association. This new branch already has 356 members. The officers are:

Chairman, George H. Jones; vice-chairman, J. T. Mountain; treasurer, William Holloway; secretary, L. E. Marshall; executive committee, E. O. Schweitzer, Thomas Walsh, H. E. Addenbrooke.

Tungsten Street Lamps in Burlington

The Burlington (Wis.) Electric Light & Power Company has just closed a five-year contract for lighting the city streets, the service to begin December first. This contract calls for one hundred watt tungsten lamps and ten ampere arc lamps.

The Burlington company will have completed its nineteenth year of city lighting at the termination of the present contract, so that the new arrangement gives them a record of almost a quarter of a century of street-lighting service.

The Pioneer

The *Electrical Record* for October in an editorial on electric signs, makes the statement that, "A study of electrical conditions in several modern department stores, made recently, shows that the electric sign is in some cases worked to nothing like its full usefulness, and central station business departments upon whose lines this class of customer can be found, would do well to push the electric sign more vigorously." Mr. Carnegie, or some other philanthropist, should give the *Record* a discoverer's medal for its work in unearthing these unique facts.

Busy in Kankakee

Mr. J. A. Maltman, the superintendent, tells us that the Kankakee (Illinois) Electric Light Company has one tungsten lamp in service for every ten persons in the city. Let us say that Kankakee has about sixteen thousand population; that would mean sixteen hundred tungsten lamps in use in the city. When you think it over and figure out your percentage of tungstens per hundred population, you'll probably unite with us in congratulating Kankakee.

Electricity in Catholic Churches

The Sacred Congregation of Rites, at Rome, has issued with the full Papal sanction certain regulations of an interesting character concerning the use of the electric light in all churches, cathedrals and religious buildings throughout Catholic Christendom.

Electric lights are recommended for general lighting purposes and are allowed for candles in chandeliers and other ornamental lighting except where the use is purely symbolical, as the candles around the altar.

The Electric Office

October 17th to 24th saw the Ninth National Business Show at Madison Square Garden, New York.

This year's show was interesting for the man selling current because of the ever increasing line of office appliances driven by small motors. Motor driven adding machines, wrapping machines, vacuum cleaners, sealing machines, folding machines and time stamps were there in great profusion. This line is increasing in great leaps. Where a few years ago there was one motor driven machine for the office there are now a hundred. While the motors on the greater part of these machines are of small power, they use enough current to make it profitable for the central station man to handle them.

To Light the "Tomb of the Prophet"

An English Syndicate has secured the contract for a very complete installation of electric lights in the sanctuary at Mecca, usually called the Tomb of the Prophet.

The Tomb contains the body of Mo-

hammed and many relics sacred to the Mohammedans.

The plan is to light the tomb, which is surrounded by many passages and galleries, by means of thousands of small delicately colored lamps, most probably miniature tungstens or tantalums.

The installation is made at the request and by the authority of the Sultan of Turkey, the Holy Father of the Moslem world.

Big Weeklies Consolidate

Beginning with the issue of November 7th, 1908, the *Electrical Review* and the *Western Electrician* were consolidated and are now published as the *Electrical Review and Western Electrician.*

While the new magazine will be published from Chicago, the form of the *Review* will be kept as will its New York editorial offices and staff, strengthened by part of the *Western Electrician* board.

This consolidation promises an unusually strong magazine, with a strong clientele in both East and West.

Canada's Cheap Tungstens

In the *Canadian Electrical News* for October we note the advertisement of a prominent supply house handling foreign lamps. They make the following reasonable offer on 40 watt tungstens:

"Price to Lighting Companies $.125 each."

As we have never seen the lamp sold for less than a dollar, we predict that there will be a ready market for it at this new twelve-and-a-half cent price. We wish them all sorts of luck.

To License the Electrical Contractors

The *National Electrical Contractor* tells of an act to license electrical contractors before the Louisiana Legislature. This act, if passed, will empower the governor to appoint, in cities of more than fifty thousand population, a board to be known as the Board of Electrical Examiners and Supervisors; this board to examine all applicants and grant licenses to such as are fitted to be "Master Electricians."

The master electrician will be the only man allowed to wire buildings and he will be responsible for damage caused by defective wiring within a period of one year unless the work be approved by an Underwriters' Inspector.

Good moral character, a knowledge of the natural laws appertaining to electricity, a knowledge of wiring and of lighting and power applications gained by three years "in the field" are the chief requirements that the applicant must meet.

Should Louisiana make this a law it will furnish an interesting example to other states and, needless to say, will be very earnestly watched by the contractors and central stations in all parts of the country.

A Hotel Experiment

The ornamental posts shown in the illustration were equipped with enclosed arc lamps which proved far from satisfactory,

as owing to the construction of the posts, the shadows were very marked and there was very poor light on the sidewalk.

Recently, the Savoy Hotel (New York) proprietors, who owned the posts, installed 100 watt meridian type tungstens, pendant, and claim to have solved the ornamental lighting problem.

The Pennsylvania Contract

The contract for the electrification of the New York terminal of the Pennsylvania Railroad has been awarded to the Westinghouse Electric and Manufacturing Company.

The initial contract, which was made public November first, calls for apparatus costing five million dollars.

Among the materials called for by the contract are a hundred of the four thousand hp. locomotives that the Pennsylvania has recently been testing. These locomotives, the most powerful ever built, will be capable of a speed of 120 miles an hour and will be used from Newark, to Jamaica, Long Island.

This contract and the others necessary to complete the electrification will furnish more than two years' work for many of the Westinghouse men who were laid off at the time of the panic.

A New York Sign Stunt

The New York Edison Company caused more or less comment during the Electrical Show by putting on the streets one of their big gray supply autos bearing a large electric sign advertising the show. The car was run on Broadway and the other principal "night" streets. The sign was, of course, run from storage batteries, presumably the same ones that furnished the motive power for the auto.

One Motor Blew Up

In discussing a year's accidents to electrical machinery in Great Britain, Mr. Michael Longridge, chief engineer of the British Engine, Boiler & Electrical Insurance Company, of Manchester, to whose annual report reference has previously been made in these columns, says that a large number of accidents were due to "something" getting into the motor. A piece of cinder, a couple of rats, and some soft soap all figure among causes of troubles while, of course, dust, dirt, and oil did their share of damage. One motor exploded violently, presumably on account of the firing of gas evolved by the charring of some of the insulating material. What the latter consisted of could not be ascertained, as the motor was of foreign manufacture.—*Electrical Record.*

Wagner Ventilating Outfit

The Wagner Electric Manufacturing Co. announce that they are now able to supply a single-phase, variable-speed, ventilating fan outfit with auto transformer speed controller.

These variable speed fans will be useful in stores, hotels, laundries and other locations where strong ventilation is required. By means of the auto transformer speed controller the Wagner outfit is capable of being regulated for ten different speeds, whereby it may be operated according to varying weather and temperature conditions very satisfactorily.

It is claimed that these outfits will do everything that direct current outfits will, and have the advantage of operating under full speed conditions with no commutator or brush wear on the motor.

The Hopfelt Lamp

The Electrical World describes the mercury-vapor carbon-filament lamp of Herr R. Hopfelt, of Berlin.

The lamp consists of a U-shaped tube containing a carbon filament, an inert gas and a drop of mercury. There is an outer globe resembling that of the ordinary carbon lamp, but not evacuated, and the ordinary screw-in socket.

The theory of the lamp is based on the fact that the carbon lamp could be operated at a much lower specific consumption than it is, if the filament did not vaporize and blacken the lamp. Enclosing the filament in the inert gas is supposed to prevent this vaporization.

While the lamp consumes over one and one-half watts per candle at first, Herr Hopfelt claims that its efficiency is greatly increased with age. The main trouble seems to lie in their short life, which is between 25 and 300 hours.

New Tungsten Factory at Shelby

A new tungsten lamp factory having a working area of thirty-five thousand feet, has just been completed at Shelby, Ohio, and will begin to make deliveries of tungstens in November. This is the fifth factory built and put into operation by the Tungsten Lamp Company in a very few months.

Test to Show Cause of Tungsten-Filament Breaks

From "The Western Electrician"

Whether a tungsten filament has broken in service, that is, when hot, or been parted by a jar or vibration when the current was not turned on, can be determined from an examination of the fracture. If the break occurred while the filament was cold the ends of the thread will show an almost square break. But if the lamp had been burning at the time, the ends will be discovered ot be drawn down to a taper at the end of which a bead is formed. The cold break, on the contrary, shows a uniform section to the end. In examining the lamp filament a rather strong reading or magnifying glass should be used and the lamp held over a dark surface in good light. With these precautions the filament end can easily be observed.

Negligent lamp fitters sent out to install tungsten lamps sometimes allow the filaments to become broken during transportation and then, to exonerate their carelessness, report that the lamp burned out immediately after the current was turned on. In this way the tungsten lamp gets a "black eye" for a failure during operation and many such "burn-outs" are doubtless recorded which if the truth were known, existed before current had been turned into the lamp. The new high-efficiency lamps are delicate piecs of apparatus, and lamp men must be trained to give them due care in handling while cold, but it is unjust to the manufacturers and the progress of the art to ascribe breakage really due to carelessness of the installer or customer as being the normal death of the lamp during operation.

Operating companies who are experimenting with the tungsten filament and keeping a comparative record of the performance of the lamps they place, will have a valuable check on the reports of "broken" and "burned out" by examining the lamps. Of course it sometimes happens that, due to jarring and rough handling while cold, the filament is strained and is all ready to break, so that when the current is turned on the burn-out that follows gives many of the evidences of a service failure, although carelessness is the principal contributing factor. But an inspection of the filament ends will certainly relieve the tungsten filament of some of its burden of reported failures and should be carried out in the interest of a fair show for the new illuminant.

Gaining Public Confidence

In an address on "Advertising Public Service Corporations" delivered before the Michigan Gas Association, Mr. E. St. Elmo Lewis makes the gaining of public confidence his strongest note. Mr. Lewis has it that public confidence contributes as much toward a fair rate and an efficient service as does good management at the power-house.

Mr. Lewis said in part:

I believe in recognizing conditions in this country, and I believe it is one of the most dangerous and purblind of doctrines to hold that any corporation can, in the long run, be friendly only with the representatives of the people and not with the people themselves. Any policy that calls for making a confidant of the public may seem to many of you gentlemen as a foolish waste of time, money and effort, and fruitful of misunderstanding and painful anxiety.

Could there be greater anxiety than you have sometimes suffered—greater misunderstandings than those which today mar your relationships in many sections?

The biggest coward in the world is the man who holds office by virtue of his organization. The next biggest coward in the world is the newspaper proprietor when afraid of his circulation and advertising.

The one is afraid of policies, principles and education—and so is the other.

Dealing with either with a view to permanent peace is but whistling against the wind.

Make your peace with the people and you can make a venal politician eat out of your hand, and a dishonest newspaper editor jump through a hoop. It is obvious that no corporation having the confidence and the support of the people can be rendered unsafe in its tenure of franchise or unprofitable in the exercise of its business.

It is the question:—How can we get the confidence and support of the public?—that immediately concerns us.

I offer an apparently simple, yet really difficult, remedy—education—show it what it is getting for the money. The people are eager to learn, and they investigate and learn all the time. They gain impressions and knowledge. They may learn little that is true or right,—but they learn something.

It is regrettable that one of your own

people can find it in his experience to say:

"The public, or their representatives, have very little conception of the business of manufacturing, distributing and selling gas; they have little or no idea as to what is being done each hour of the day and each day of the year by the managers to furnish an uninterrupted and uniform service at rates that are exceedingly reasonable and fair."

I quote the foregoing from an ex-president of the American Gas Light Association, Mr. Edward G. Pratt.

Where are the people to go for this better "conception of the business of manufacturing, distributing and selling gas"—where are they to go to get the proper "idea of what is being done," etc.?

Shall they not go to the gas company? What do the people know about the physical value of properties?

The actual cost of manufacture?

The cost of distribution?

Depreciation of plant and equipment?

Cost of injuries and damages?

The real truth about the operation of meters?

What do the people actually know about the many tangible and intangible things that constitute the "service" for which they pay, when they think they are only getting so many cubic feet of a commodity?

The public ignorance on these things may pass your belief—yet it is a stubborn and dangerous fact.

"— As She is Writ in India"

We take the following letter written to a well known firm in Calcutta from the *West Ham Electrical Bulletin.*

DEAR SIRS:

I received your parcel containing 3 glasses with 3 holders for electric light, on opening the parcel, I tried these glasses to be lighten up by 6 Leclanche strong cells, but to no effect.

At last I have kept them packed and am writing you for instructions that how shall I get them lighthed, which battery is required and how many, reply sharp or will return the 3 glasses with 3 holders to you back, as they are useless to me. The V.P. was of Rs. 1/14/- and railway freight I gave -/4 as /-. An early reply solicited with instructions. And if you have got the suitable batteries for these glasses, write with price each, will get from you. Kindly inform 'That how many battery will light one glass,' then by that proportion I shall issue orders. The glasses you sent to me are of 32 c.c.p., 225 volts at Rs. 1/8/- each. And I did not receive any amperes in the parcel. If you charged for it, inform, send invoice also.

Yours, etc.,

CHUNDY SAOI.

Circular Loom O. K.

The American Circular Loom Company has announced that the new factory at North Cambridge, Massachusetts, is in full operation and that orders for Circular Loom will be promptly filled.

Some of the announcements end with the direct appeal, "Send us your orders. We need them."

The Circular Loom people are to be congratulated on so quick a recovery from their disastrous fire and they open with the best wishes of the industry.

A. E. Morrow Moves

Alfred E. Morrow, for many years connected with the Chicago office of the H. T. Paiste Company, of Philadelphia, Pa., has joined the sales force of the Marshall Electric Company, of Boston, Mass. This is true also of Mr. Percy R. Frost, who until recently was the general sales manager of the Stuart-Howland Company, of Boston.

New Cutler-Hammer Man

H. P. James, formerly electrical engineer of the Bryant Electric Co., of Bridgeport, Conn., now occupies the position of sales manager for the new line of push-button specialties recently placed on the market by the Cutler-Hammer Mfg. Co., of Milwaukee.

Kulas Goes West

E. J. Kulas, vice-president and general manager of the Tungstolier Co., of Cleveland, Ohio, recently left for the Pacific Coast with the intention of establishing branch offices in San Francisco, Los Angeles, and Seattle.

Kirkpatrick Wants Men

Mr. J. S. Kirkpatrick, of the New York and Queens Electric Car Co., Long Island City, announces that he is anxious to secure a power expert, a general man for special commercial work and one or two solicitors.

Do You Agree With Us?

Shelby Tungsten Lamps

Properly equipped are the most efficient lighting units of the day. They furnish the MOST USEFUL, i. e., DOWNWARD LIGHT for a given expenditure of energy.

Shelby Useful Light Lamps

Compared to other carbon lamps produce the MOST USEFUL LIGHT for a given expenditure of energy whether reflectors are or are not used. We have tests to prove it.

Now Isn't It So?

Downward light is acknowledged by everyone to be of the utmost importance when high efficiency lamps are used; hence the employment of reflectors.

Downward light is equally important when Carbon Lamps are installed.

Shelby Useful Light Lamp. **Shelby Oval Filament Lamp.**
Shelby Gem Metallized Lamp.
Shelby Tantalum Lamp. **Shelby Tungsten Lamp.**

The most efficient in their respective classes.

The Shelby Electric Co.

Shelby, Ohio, U. S. A.

HOW TO ADVERTISE A RETAIL STORE

BY ALBERT E. EDGAR

TEACHES

How to lay out advertising copy,
How much space to use,
How to design an attractive space-saving name-plate,
What a headline should accomplish,
How to get and use proper illustrations,
How to write your advertising introductory,
How to describe an article so as to make sales,
What style and method of pricing you need,
The preparation of effective, free advertising,
How to find and properly use selling points,
The making of store papers, booklets, leaflets, folders, advertising letters, and mailing cards,
The organization of a follow-up system,
The uses of calendars, blotters, post-cards, advertising novelties, package enclosures, and hand-bills,
Proper methods of window advertising,
Correct outdoor advertising,
Spring, fall and other openings advertising,
Two-hundred-fifty selling helps, guessing and voting contests, drawings, schemes to attract boys and girls, premium schemes,
The sensible advertising of special sales and clearance sales,
The uses of leaders and bargains,
Many novel sales plans,
The promotion of business in a number of specific retail lines—this department alone occupies about 100 pages,
Mail order advertising and general advertising,
Points about type, borders, ornaments, and cuts,
Nearly 20 pages of practical and helpful hints on how to lay out advertising copy,
How to read proof and technical terms.

How this is done is demonstrated by the use of

641 ILLUSTRATIONS AS MODELS

Showing how all these things are accomplished by the highly paid ad managers and the cross-roads storekeepers

Price $3.50 Postpaid—on a money-back basis

THE OUTING PRESS, DEPOSIT, NEW YORK, U. S. A.

In writing to advertisers, mention "Selling Electricity."

I stand the expense!
I do all the work!
You increase your sign load.

S U C C E S S

R U S S E L L

All I ask of you is a list of your sign prospects.

I will sell them direct.

J. L. RUSSELL
AMERICAN ELECTRIC SIGN CO.
41 High St., Boston, Mass.

Mr. Consumer:

When you buy Lamps

Buy G. I. Lamps

Best Lamps
Lowest Prices

The General Incandescent Lamp Co.
Cleveland, Ohio

Cincinnati Office: 225 E. 4th St.
San Francisco Office: 403 Atlas Bldg.
Seattle Office: 223 Colman Bldg.

ELECTRIC

SUPPLIES
TELEPHONES
NOVELTIES

Catalog of 200 Free. If it's Electric we have it. Big Catalog 4c

OHIO ELECTRIC WORKS, Cleveland, Ohio

The World's Headquarters for Dynamos, Motors, Fans, Toys, Batteries, Belts, Bells, Lamps, Books.

We Undersell All **We Want Agents**

Wagner Electric

Manufacturing Company, St. Louis, Mo.

Producers of the
Commercially Successful Single-Phase Motor

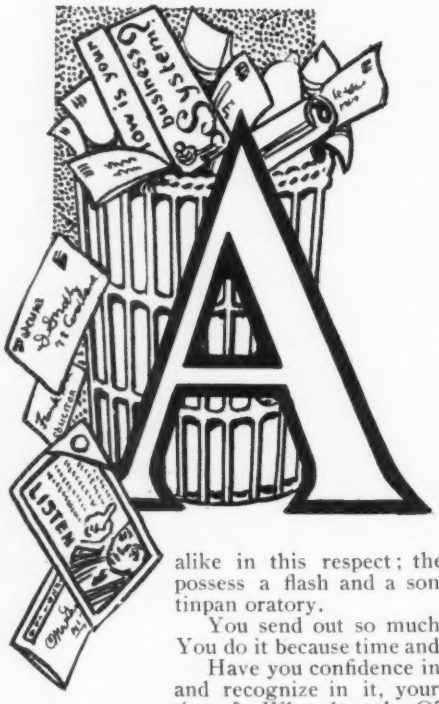
Pioneers in Power and Lighting Transformers

Manufacturers of the most comprehensive line of Switchboard & Portable Instruments offered today

Correspondence invited—Address the nearest office

Atlanta, Ga.	Empire Building	**New York, N.Y.**	50 Church Street
Boston, Mass.	110 State Street	**Philadelphia, Pa.**	Real Estate Trust Bldg.
Chicago, Ill.	Marquette Building	**Pittsburg, Pa.**	Farmers Bank Building
Cincinnati, O.	First National Bank Bldg.	**Portland, Ore.**	McKay Building
Cleveland, O.	New England Building	**St. Louis, Mo.**	6400 Plymouth Avenue
Denver, Colo.	1621 Seventeenth St.	**San Francisco, Cal.**	Balboa Building
Kansas City, Mo.	Dwight Building	**Seattle, Wash.**	Pacific Block
Los Angeles, Cal.	210 So. Los Angeles St.	**Sioux City, Ia.**	515-517 Fifth Street
Minneapolis, Minn.	Security Bank Bldg.	**Montreal, Canada.**	Bell Telephone Bldg.

WHERE THE POWER COMES FROM



CENTRAL STATION MAN the other day dropped the remark that electrical advertising was so much alike the only way he could tell the difference between campaigns was to "look at the lamps."

Then he pointed to the waste basket.

Uncle Sam's morning mail had given it a busy and prosperous appearance. It was brimming.

Pamphets, booklets, form letters, mailing cards and folders were in the discard. One glance through them illuminated the subject; there was a sameness, a monotony—a sort of "cold-gray-dawn-of-the-morning-after" repetition.

Because an idea happened to be obvious without extra brain-energy, it was popped on to paper and Fate seem to ordain that every other man had the same impromptu plan, or picture, or line of thought.

The power in any piece of publicity comes from its originality—from the "spark" in it. The same thing is true of electric lamps. The market is flooded with "Just lamps"; but the one that makes a Broadway glitter has an extra "spark," you'll find—and that's the lamp that does business.

Men, lamps, and advertisements are much alike in this respect; they've got to rise above the common-place; must possess a flash and a something that means genius, not clothes, type, and tinpan oratory.

You send out so much publicity print and picture each year, don't you? You do it because time and trade have proven the vital necessity and good of it.

Have you confidence in this postage-eating process? Do you read it over and recognize in it, yourself, something in keeping with the spirit of the times? What does the OTHER MAN think of it?

The Ethridge Company likes the preparation of copy and designs of this nature for YOUR business in a way that a conscientious student likes his problems—they fascinate him with their possibilities. If it's a lamp fixture or a coil of wire, our force wants to prick them and see the red blood flow; in short, desires to "get next" to the essential parts and features before a line is written or a stroke is drawn.

This is not only common sense, but it is business judgment. It makes the Ethridge Company broad in its views, experienced in its handling of many subjects, and practically valuable to the concern for whom it is working.

If you want copy or designs that have the "spark," if you want the publicity that "rings true" from the intelligent interpretation of the problem, drop in, by person or pen. You'll find that we don't illustrate electric light or power ads with pictures of East India Fakirs, and we do not dodge commercial facts by cloaking copy in everything from Ben Franklin to the Congressional Record.

We write and draw YOUR business.

GE

THE ETHRIDGE COMPANY

41 UNION SQUARE, NEW YORK CITY

THE Electric Chafing Dish

will be used when the hostess is entertaining her friends. That means that in the course of a season she will give any number of people in her own social set—often her neighbors—a demonstration of electric cooking. On such occasions every feature of the chafing dish comes in for its share of interest and criticism. Then the practical features of the Simplex count for much—dish and stove separable, the former easily removed for cleaning, the latter useful alone for toasting, the three-heat switch, the attractive pattern and the high quality and finish—all these things will be seen and remembered by people who are able to buy for themselves. There is no better appliance for teaching electric heating than the chafing dish and no better chafing dish than the Simplex to use as an example.

SIMPLEX ELECTRIC HEATING CO.

Cambridge, Mass.

Monadnock Building, Chicago

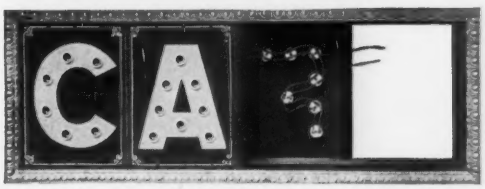
This Inexpensive Tungsten Cluster

Is very popular on account of its neat and compact design as well as its low price and wide, even distribution of light.

Federal Tungsten Clusters are made in many styles. Write for our Bulletin No. 287 containing illustrations and prices.

Federal Electric Company

Lake and Desplaines Street **Chicago, Ill.**



Our Sectional Letter Sign

Porcelain enamel white letters on royal blue or black background

For signs like this one, returned free of expense to us in good condition after one or two years' use, we refund a liberal percentage of their first cost.

Haller Sign Works (*Inc.*)

319-320 S. Clinton Street

CHICAGO

THE NEW Electrocraft Illustrated List *of* Officially Approved Electrical Supplies

is now in preparation and will shortly be issued.

The publishers make the further important announcement that in view of the extraordinary influence exerted by this unique publication in promoting National Code construction practice, and for the purpose of giving the widest possible extension to its field of activity, it will hereafter be distributed

Absolutely Without Charge.

The new Electrocraft Illustrated List is a vast improvement on the old publication. The pages have been greatly enlarged to allow of fuller description and finer representation of the different lines of material; and in paper, type and illustration the new list will be a beautiful example of the printing art. In it will be found *everything electrical* that has successfully passed the tests of the Underwriters' Laboratories and that should be used in National Code construction work; and all clearly described and strikingly illustrated.

The revised National Electrical Code, with many finely made cuts and drawings illustrating the application of the principal rules will continue to form an interesting and highly valuable feature of the book.

POSTSCRIPT IMPORTANT: The mailing list is now being revised. In order to avoid the omission of names and to ensure perfect accuracy in the addresses, all persons wishing to receive copies of the new list are requested to write the publishers at once. In all cases, the letterheads of the applicants must be used in order to gain attention.

Electrocraft Publishing Co., DETROIT, MICH.

Sell What the People Want to Buy

THERE is a constant trend of the public mind toward better taste in lighting fixtures and portables, toward a realization of the beauty of simple, graceful lines.

The public is breaking away from the clumsy, over-decorated brassware that delighted tinsel-loving minds of a few years ago.

Are you taking advantage of this turning toward true, simple beauty and good craftsmanship?

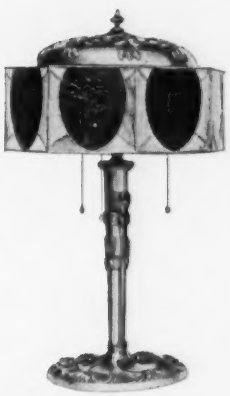
Do you realize the popularity of the well-made, simple, graceful—yet sturdy, **Miller** portable lamp?

Don't you think you might as well sell what the public wants?

Look at this Example

Note its graceful lines
—its *simplicity*.

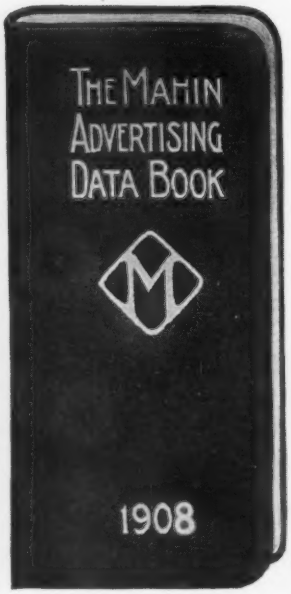
Our catalog tells more about it and others.



Edward Miller & Company

Meriden, Connecticut

Do You Ever Want to Know



The size of a billboard poster?

The size of a street car card?

What Poultry, Farm and other papers are published in a given state or locality?

How to correct proof so the printer will understand?

The number of words in a square inch of type?

What 10-point type—or any other point—means?

How advertising space is measured—in newspapers or magazines?

The width of a column—in newspapers, magazines, mail order papers?

What kinds of type you want to use?

How population is distributed by states?

The average wages of a given class of people?

Number of Dealers in various lines, by states?

A date—for this year or next?

The cost of advertising in any publication?

Or on billboards?

Or street cars?

Lists of Publications—daily, weekly, monthly—papers, magazines, religious, agricultural, mail-order, etc.—rates—dates of closing advertising forms—width of column—etc.

The MAHIN Advertising Data Book

TELLS all the above and many other things—and you can have it *with* you, *all* the time, in your *vest pocket*—to consult to your profit at odd moments. It is a beautiful little volume of 556 pages on India paper, gilt edged, bound in red morocco, flexible covers, gold stamped.

The Mahin Advertising Data Book is worth more than the price—but in addition you will receive:

Five Addresses *by John Lee Mahin*

Advertising the Highest Form of Commercial Achievement—delivered before the University of Michigan.

The Basis of Advertising—delivered before the Pacific Coast Advertising Men's Association.

The Commercial Value of Advertising—delivered before the College of Commerce and Administration of the University of Chicago.

The Purchaser's State of Mind—An Essential of Value—delivered before the University of Illinois.

Who Pays for the Advertising?—delivered before the International Advertising Association.

And a Sample Copy of THE MAHIN MESSENGER

If, after ten days you would like to keep all of the above and be put upon our list to get The Mahin Messenger eleven more times, then just send us $2.00 and the literature is all your own. If you do not want the Data Book, the lectures and the Messenger, return them and you owe us nothing. We reserve the right to withdraw this offer.

MAHIN ADVERTISING COMPANY
823 American Trust Building, Chicago

S. C. DOBBS, Sales Manager, the Cocoa Cola Company, Atlanta, Ga., says: "I could not properly run the advertising end of this business without The Mahin Advertising Data Book."

CUT ON THIS LINE

MAHIN ADVERTISING COMPANY
823 American Trust Bldg.
CHICAGO

Gentlemen:—Please send me on ten days' free trial—

1—The Mahin Advertising Data Book.

2—The Mahin University Lectures.

If after 10 days I would like to keep the same, I will send you two dollars, and you are to send me The Mahin Messenger for 1908 without further cost or action on my part.

Name.....

Address .....

Schaum Engraving & Printing Co.

Successors to **Clark** Engraving & Printing Co.

Get acquainted with this sign and name.
It means Good Publicity.
Expert service for the busy manager.
Let us tell you of the plan of the

Schaum Service

Flexible—Individual—Effective

We furnish ideas. We develop ideas.
We design. We illustrate.
We engrave. We print.

SCHAUM ENGRAVING & PRINTING CO.

CHARLES W. LAMB,
Manager Publicity Service.
Formerly in charge Publicity Bureau
The Milwaukee Electric Ry. & Lt. Co.

Successors to CLARK ENGRAVING & PRINTING CO.

MILWAUKEE

Has Your Company an Illuminating Engineering Department?

MOST Illuminating Engineering Departments established by central stations, operate upon the single basis of **economy**—reduction of station income. If the Bureau of Illuminating Engineering is retained in a consulting capacity by **your** company, we will demonstrate that the true basis for such a Department is **satisfaction** to the customer, and that this almost invariably can be given at no reduction in current consumption.

The advent of the Tungsten Lamp emphasises the value of our services

Bureau of Illuminating Engineering

437 Fifth Avenue, New York

Albert J. Marshall, Chief Engineer

BETTER BUY
BUCKEYE

BETTER BUY
BUCKEYE

How to Get *Profitable* Business With Tungsten Lamps

BEFORE we began to sell Buckeye Tungsten Lamps to Central Stations, we began to study out how the Central Stations could *profitably* sell these lamps to their consumers.

We've studied—experimented—profited by the experience of every Buckeye customer.

Today, we have on file more good, sane, sensible tungsten lamp sales plans than any concern in the country. They are yours for the asking.

Write for "*The Battle for Business*" in which the facts and figures of some of the plans are given—*free*.

The Buckeye Electric Company

Main Office and Works: Cleveland, Ohio

Of course you know that Buckeye Lamps are the standard, *none better*, few as good. Investigate and you'll realize that you had

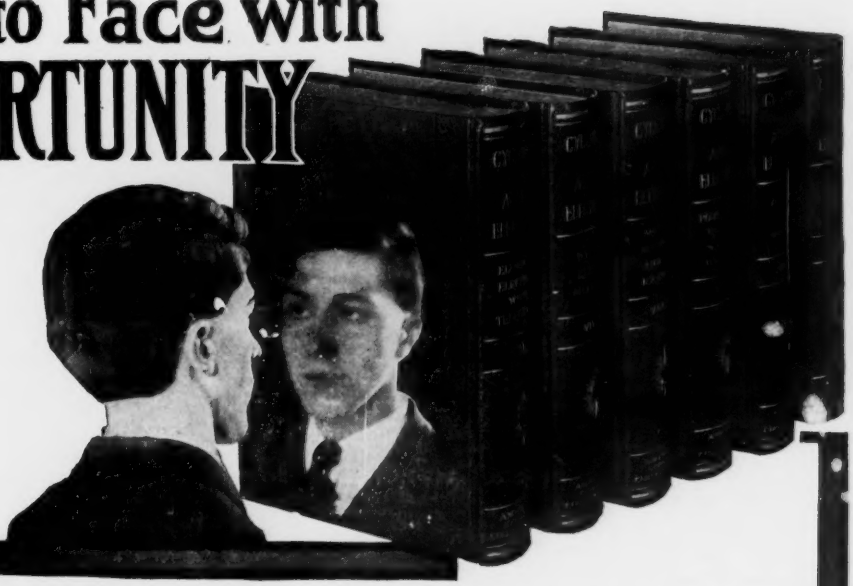
Better Buy BUCKEYE

Branch Offices

Chicago: 23 E. Lake Street
Pittsburg: 611 Empire Bldg.
Atlanta: 112 Candler Bldg.
Dallas: Linz Bldg.

S
E

Face to Face with OPPORTUNITY



Electricity controls more trades, directs more men, offers more opportunities, than any other power that man has yet discovered. A knowledge of electricity makes those opportunities yours. It opens to you new fields, gives you new ideas, keeps you abreast of the times. You can get that knowledge by ***home study,*** during your spare time, from the

CYCLOPEDIA OF APPLIED ELECTRICITY

NEW SIX VOLUME EDITION JUST OUT

5,000 Pages, 7 x 10 Inches, Bound in Half Red Morocco. 500 New Pages — Innumerable New Ideas.

Treats in detail every practical, up-to-date electrical appliance. Every subject mentioned below presents a new opportunity: every page tells you how to grasp it and profit by it. It is written so simply and clearly, and is so comprehensive and authoritative, that you will find it *full of opportunities for you,* whether you are already an expert electrician, or a young man just learning a trade.

Each section is written by an expert, illustrated by special drawing, diagram or photograph, simplified by tables and formulas, proved by practical test questions, and carefully indexed for ready reference. To introduce our correspondence courses, from which the Cyclopedia was compiled, we make this special 30 day offer.

$18.00 Special Price **Regular Price $36.00**

Absolutely FREE for 5 days' examination. Sent, express prepaid, on receipt of Coupon. If you want the books, pay us $2 within 5 days and $2 a month until you have paid the special price of $18.00; otherwise return them at our expense. ***We employ no agents to annoy you.***

Some of the Subjects Treated

Electric Wiring — Electric Bell Wiring — Electric Telegraph — Wireless Telegraphy — Telautograph — Theory, Calculation, Design and Construction of Generators and Motors—Types of Dynamos and Motors—Elevators—Direct Current Motors—Direct-Driven Machine Shop Tools—Electric Lighting, including Arc and Incandescent Lighting—Nernst Lamp, Cooper-Hewett Lamp, Osmium Lamp, Etc.—Electric Railways, including Third-Rail System, Multiple-Unit Control, Electro-Pneumatic Control—Alternating Current Motors, Etc.—Single Phase Electric Railway—Electric Welding—Mercury Vapor Converter—Management of Dynamos and Motors, including the Location and Remedy of Troubles, such as Sparking at the Commutator, Heating, Etc.—Power Stations—Central Station Engineering—Central Station Design—Storage Batteries, including Charging and Discharging, Troubles and their Remedies, Tests for Impurities, Etc.—Power Transmission—Alternating Current Machinery, including Alternating Current Generators—Synchronous Motor, Induction Motor, Transformer, Rotary Converter, Frequency Changer, Etc.—Telephony, including Instruments, Lines, Exchanges, Common Battery Systems, Operation, Maintenance — Automatic Telephone — Wireless Telephony — Telephone Line Protection—Telegraphone, Etc.

CUT OUT COUPON HERE

Sell. Elect. 11-08
A. S. of C.
Please send Cyclopedia of Applied Electricity for FREE examination. I will send $2.00 within five days and $2.00 a month until I have paid $18.00; otherwise I will notify you to send for the books.

Name.....
Address.....
Occupation.....
Employer.....

AMERICAN SCHOOL OF CORRESPONDENCE
DIV. 183, CHICAGO

NOV 27 1908

Where Do The Good Ideas Come From?

Very few men are **born** wise.

They must learn.

How?

There are **only three** ways—by schooling, by experience, by books.

You **can't learn** Central Station commercialism in school because there are no schools for you.

You **can't afford** to learn everything by **your own** experience, because experience is costly and takes years to accumulate.

The **only way** you can learn is through books—or rather, **one** book, for there's **only one magazine devoted to Central Station business getting,** and that is

SELLING ELECTRICITY.

Subscribers to **Selling Electricity** learn the latest and best methods of business getting. They see the most attractive ads done by other companies.

They know the plans, methods and systems in use by the **successful** men and **prosperous** companies.

If you want to really **know** the central station commercial game, subscribe now! Pin your dollar to this blank.

CONTINUOUS SUBSCRIPTION ORDER

FRANK B. RAE, Jr.,
74 Cortlandt Street,
New York City.

_____ 190

Dear Sir:—Enclosed find $1.00 for which please send me SELLING ELECTRICITY for one year and thereafter until I cancel this order.

Name _____

Address _____

Company _____